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ANNUAL DATA SUMMARY FOR 1988 CERC FIELD RESEARCH FACILITY

Volume II APPENDIXES C THROUGH E

by

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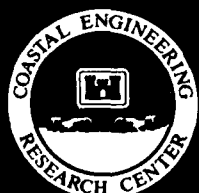


1990
C4

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Final Report

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APPENDIX C: WAVE DATA FOR GAGE 111

1. Wave data summaries for Gage 111 are presented for 1988 and for 1985 through 1988 in the following forms:

Daily H_{m0} and T_p

2. Figure C1 displays the individual wave height and peak spectral wave period values along with the monthly mean values.

Joint Distributions of H_{m0} and T_p

3. Annual and monthly joint distributions tables are presented in Tables C1 and C2, and data for 1985 through 1988 are in Tables C3 and C4. Each table gives the frequency (in parts per 10,000) for which the wave height and peak period were within the specified intervals; these values can be converted to percent by dividing by 100. Marginal totals are also included. The row total gives the total number of observations out of 10,000 which fell within each specified peak period interval. The column total gives the number of observations out of 10,000 which fell within each specified wave height interval.

Cumulative Distributions of Wave Height

4. Annual and monthly wave height distributions for 1988 are plotted in cumulative form in Figures C2 and C3. Data for 1985 through 1988 are in Figure C4.

Peak Spectral Wave Period Distributions

5. Annual and monthly peak wave period, T_p , distribution histograms for 1988 are presented in Figures C5 and C6. Data for 1985 through 1988 are in Figure C7.

Persistence of Wave Heights

6. Table C5 shows the number of times in 1988 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1985 through 1988 are given in Table C6. An example is shown below:

Height m	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	18	15		14	13	12		11	10	9									
1.0	50	34	24	21	18	14	12	8	7	3			2						
1.5	41	19	8	6	2	1													
2.0	22	9	5	1															
2.5	10	5	2																
3.0	6	1																	
3.5		1																	
4.0	1																		

This example indicates that wave heights equaled or exceeded 1.0 m 50 times for at least 1 day; 34 times for at least 2 days; 24 times for at least 3 days, etc. Therefore, on 16 occasions the height equaled or exceeded 1.0 m for 1 day exactly ($50 - 34 = 16$); on 10 occasions for 2 days; on 3 occasions for 3 days, etc. Note that the height exceeded 1 m 50 times for 1 day or longer, while heights exceeded 0.5 m only 18 times for this same duration. This change in durations occurred because the longer durations of lower waves may be interspersed with shorter, but more frequent, intervals of higher waves. For example, one of the times that the wave heights exceeded 0.5 m for 16 days may have represented 3 times the height exceeded 1 m for shorter durations.

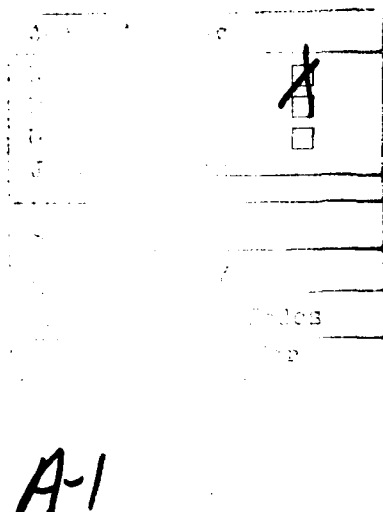
Spectra

7. Monthly spectra for the offshore Waverider buoy (Gage 111) are presented in Figure C8. The plots show "relative" energy density as a function of wave frequency. These figures summarize the large number of spectra for each month. The figures emphasize the higher energy density associated with storms as well as the general shifts in energy density to different frequencies. As used here, "relative" indicates the spectra have been smoothed by the three-dimension surface drawing routine. Consequently, extremely high- and low-energy density values are modified to produce a smooth

surface. The figures are not intended for quantitative measurements; however, they do provide the energy density as a function of frequency relative to the other spectra for the month.

8. Monthly and annual wave statistics for Gage 111 for 1988 and for 1985 through 1988 are presented in Table C7.

9. Figure C9 plots monthly time-histories of wave height and period.



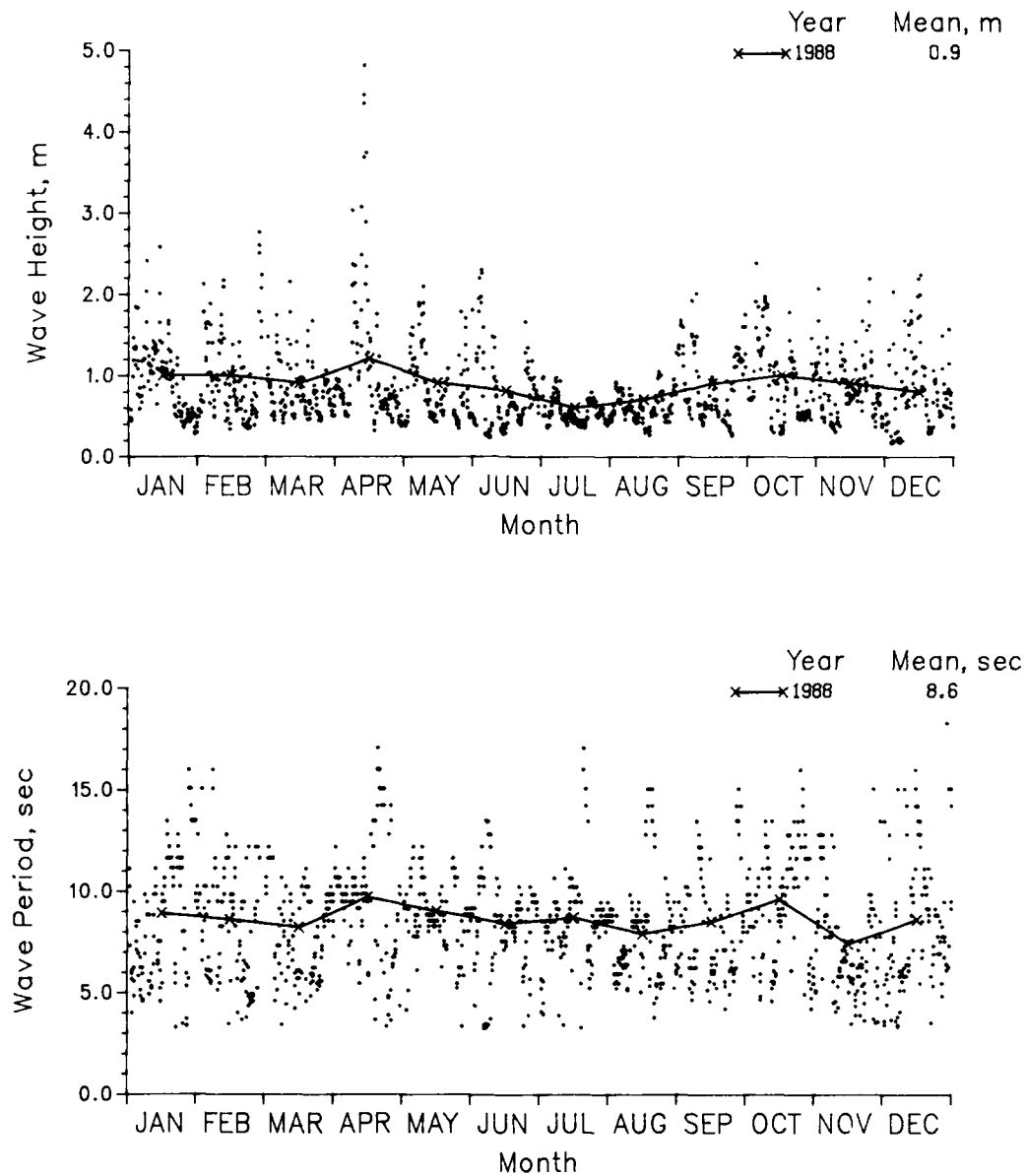


Figure C1. 1988 daily wave height and period values with monthly means for Gage 111

Table C1

Annual Joint Distribution of H_{mo} versus T_p

Annual 1988, Gage 111 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	113	28	85	99	212	578	381	381	148	226	7	2258
0.50 - 0.99	.	169	240	592	564	374	973	931	628	120	381	14	4986
1.00 - 1.49	.	7	113	465	296	183	190	212	247	42	92	.	1847
1.50 - 1.99	.	.	14	99	189	56	71	35	106	21	49	7	627
2.00 - 2.49	56	7	35	35	42	21	.	.	196
2.50 - 2.99	7	.	.	7	7	.	14	.	35
3.00 - 3.49	7	.	7	.	.	.	.	.	14
3.50 - 3.99	7	.	7	.	.	.	14
4.00 - 4.49	7	7	.	.	.	.	14
4.50 - 4.99	7	.	.	.	7
5.00 - Greater	0
Total	0	289	395	1241	1198	832	1868	1608	1425	352	762	28	

Table C2
Monthly Joint Distribution of H_m versus T_p

January 1988, Gage 111 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	161	.	81	.	81	81	323	484	403	242	.	1856
0.50 - 0.99	.	161	242	403	161	81	484	242	1048	242	403	.	3467
1.00 - 1.49	.	.	323	1048	484	323	323	565	565	.	161	.	3792
1.50 - 1.99	161	81	.	81	81	81	.	.	566
2.00 - 2.49	161	81	.	.	.	.	.	.	242
2.50 - 2.99	81	.	.	.	.	.	.	.	81
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	322	565	1532	1048	647	888	1211	2178	726	887	0	

February 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	86	172	86	259	.	86	345	345	.	345	.	1724	
0.50 - 0.99	.	172	603	259	172	172	776	1034	862	.	603	.	4653	
1.00 - 1.49	.	.	86	603	259	.	172	345	431	.	.	.	1896	
1.50 - 1.99	.	.	.	172	431	86	172	86	86	.	.	.	1033	
2.00 - 2.49	86	.	86	86	172	.	.	.	430	
2.50 - 2.99	86	.	.	172	.	258	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	258	861	1120	1207	258	1292	1982	1896	0	1120	0		

March 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	.	.	331	.	83	165	83	331	.	.	.	993	
0.50 - 0.99	.	83	165	826	744	496	992	1818	1488	.	83	.	6695	
1.00 - 1.49	.	.	248	661	165	413	83	83	248	.	.	.	1901	
1.50 - 1.99	.	.	83	83	83	83	.	.	.	.	.	.	332
2.00 - 2.49	83	.	.	.	.	.	.	.	83	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	83	496	1901	1075	1075	1240	1984	2067	0	83	0		

(Continued)

(Sheet 1 of 4)

Table C2 (Continued)
Monthly Joint Distribution of H_{mo} versus T_p

April 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	259	259	86	259	172	.	1035	
0.50 - 0.99	.	345	259	259	776	259	259	862	1121	345	1207	86	5778	
1.00 - 1.49	.	.	.	172	86	172	.	603	86	.	.	.	1119	
1.50 - 1.99	.	.	86	86	.	86	.	.	517	.	.	.	775	
2.00 - 2.49	86	.	.	345	172	.	.	.	603	
2.50 - 2.99	86	.	.	.	86	
3.00 - 3.49	86	.	86	.	.	.	.	.	172	
3.50 - 3.99	86	.	86	.	.	.	172	
4.00 - 4.49	86	86	.	.	.	.	172	
4.50 - 4.99	86	.	.	.	86	
5.00 - Greater	0	
Total	0	345	345	517	1034	517	776	2155	2240	604	1379	86		

May 1988, Gage 111 Percent Occurrence(X100) of Height and Period													Total
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	93	.	93	926	463	463	.	.	.	2038
0.50 - 0.99	.	93	93	.	278	370	1852	1204	556	.	93	.	4539
1.00 - 1.49	.	.	.	278	.	278	648	370	556	.	.	.	2130
1.50 - 1.99	.	.	.	93	185	93	278	93	278	.	93	93	1206
2.00 - 2.49	93	.	.	.	93
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	93	93	464	463	834	3704	2130	1946	0	186	93	

June 1988, Gage 111 Percent Occurrence(X100) of Height and Period													Total
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	420	.	.	.	504	840	504	504	252	336	.	3360
0.50 - 0.99	.	168	.	.	252	336	1849	1597	168	.	.	.	4370
1.00 - 1.49	.	84	168	252	588	168	84	.	84	.	84	.	1512
1.50 - 1.99	.	.	.	84	84	.	84	84	168	.	.	.	504
2.00 - 2.49	168	.	84	.	.	.	252
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	672	168	336	924	1008	3025	2185	1008	252	420	0	

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Table C2 (Continued)
Monthly Joint Distribution of H_m versus T_p

July 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	81	.	81	161	645	1371	1129	887	.	403	81	4839	
0.50 - 0.99	.	242	161	484	323	645	2258	726	81	161	81	.	5162	
1.00 - 1.49	0	
1.50 - 1.99	0	
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	323	161	565	484	1290	3629	1855	968	161	484	81		

August 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	.	.	81	407	488	1220	244	81	163	163	.	2847	
0.50 - 0.99	.	81	81	1951	1138	407	1382	976	.	244	325	.	6585	
1.00 - 1.49	.	.	81	325	163	.	.	.	.	.	.	.	569
1.50 - 1.99	0	
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	81	162	2357	1708	895	2602	1220	81	407	488	0		

September 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	94	189	472	377	377	.	189	.	1698	
0.50 - 0.99	.	.	283	755	849	283	566	1038	377	189	189	.	4529	
1.00 - 1.49	.	.	94	472	660	283	377	.	189	472	283	.	2830	
1.50 - 1.99	.	.	.	189	283	94	189	94	.	.	.	.	849
2.00 - 2.49	94	.	.	.	.	.	.	.	94	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	0	377	1416	1980	849	1604	1509	943	661	661	0		

(Continued)

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Table C2 (Concluded)
Monthly Joint Distribution of H_{mo} versus T_p

October 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	83	496	83	496	331	248	.	1737	
0.50 - 0.99	.	.	165	331	331	.	331	909	1240	165	661	.	4133	
1.00 - 1.49	.	.	331	661	248	83	83	331	661	.	496	.	2894	
1.50 - 1.99	.	.	.	248	248	.	165	.	165	83	248	.	1157	
2.00 - 2.49	83	.	.	.	.	.	83	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	0	496	1240	827	166	1158	1323	2562	579	1653	0		

November 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	84	84	.	.	336	672	84	168	168	336	.	1932	
0.50 - 0.99	.	504	672	1092	1008	840	336	420	84	.	420	.	5376	
1.00 - 1.49	.	.	.	756	504	168	504	168	.	.	.	.	2100
1.50 - 1.99	.	.	.	84	168	168	.	.	.	.	.	.	420
2.00 - 2.49	84	.	84	.	.	.	.	.	168	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	588	756	1932	1764	1512	1596	672	252	168	756	0		

December 1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	496	83	248	248	.	331	661	331	165	248	.	2811	
0.50 - 0.99	.	165	165	661	744	579	579	413	496	83	496	83	4464	
1.00 - 1.49	.	.	.	331	413	331	83	83	165	83	83	.	1572	
1.50 - 1.99	.	.	.	165	413	.	.	.	.	83	165	.	826
2.00 - 2.49	83	.	.	.	.	248	.	.	331	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	661	248	1405	1901	910	993	1157	992	662	992	83		

Table C3
Annual Joint Distribution of H_m versus T_p (All Years)

Annual 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	11	74	41	67	113	228	724	407	365	172	278	4	2484
0.50 - 0.99	6	141	233	463	515	378	1018	768	540	143	281	6	4492
1.00 - 1.49	.	15	131	409	302	174	270	211	244	22	93	.	1871
1.50 - 1.99	.	.	11	126	178	70	68	59	120	26	56	2	716
2.00 - 2.49	.	.	.	7	39	37	41	37	65	17	22	.	265
2.50 - 2.99	.	.	.	.	4	6	7	7	37	9	19	.	89
3.00 - 3.49	.	.	.	.	4	7	9	17	9	4	6	.	56
3.50 - 3.99	.	.	.	.	.	.	7	2	6	2	2	.	19
4.00 - 4.49	.	.	.	.	.	.	2	2	2	.	4	.	10
4.50 - 4.99	.	.	.	.	.	.	.	.	4	.	.	.	4
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	17	230	416	1072	1155	900	2146	1510	1392	395	761	12	

Table C4
Monthly Joint Distribution of H_m versus T_p (All Years)

January 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	126	21	21	21	189	526	505	400	211	337	21	2378	
0.50 - 0.99	.	189	232	421	400	295	842	358	674	63	232	.	3706	
1.00 - 1.49	.	21	232	632	442	168	232	295	232	.	63	.	2317	
1.50 - 1.99	.	.	.	189	379	84	84	84	63	21	21	.	925	
2.00 - 2.49	147	126	105	21	42	.	42	.	483	
2.50 - 2.99	21	.	42	.	84	.	.	.	147	
3.00 - 3.49	21	.	.	.	21	
3.50 - 3.99	21	.	.	.	21	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	336	485	1263	1410	862	1831	1263	1537	295	695	21		

February 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	23	47	23	70	23	163	233	163	47	209	.	1001
0.50 - 0.99	.	116	209	488	535	372	860	977	837	116	233	23	4766
1.00 - 1.49	.	.	140	721	512	209	302	395	395	23	233	.	2930
1.50 - 1.99	.	.	23	140	302	93	70	70	163	.	23	.	884
2.00 - 2.49	.	.	.	23	23	.	23	47	70	.	.	.	186
2.50 - 2.99	23	23	.	70	.	116
3.00 - 3.49	23	.	.	70	.	.	.	.	93
3.50 - 3.99	23	.	.	.	.	23
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	139	419	1395	1465	697	1418	1838	1651	186	768	23	

March 1985-1988, Gage 111													
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	21	.	.	83	62	124	331	228	290	83	83	.	1305
0.50 - 0.99	.	62	124	518	580	393	1077	1118	725	62	62	.	4721
1.00 - 1.49	.	21	186	414	455	186	228	311	497	.	21	.	2319
1.50 - 1.99	.	.	21	124	145	124	124	62	166	.	104	.	870
2.00 - 2.49	41	21	41	104	145	.	104	.	456
2.50 - 2.99	21	83	21	62	.	187
3.00 - 3.49	21	.	.	.	21
3.50 - 3.99	21	.	21	21	.	.	63
4.00 - 4.49	41	.	41
4.50 - 4.99	21	.	.	.	21
5.00 - Greater	0
Total	21	83	331	1139	1283	848	1822	1844	1969	187	477	0	

(Continued)

(Sheet 1 of 4)

Table C4 (Continued)
Monthly Joint Distribution of H_m versus T_p (All Years)

April 1985-1988, Gage 111														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	22	.	.	.	22	44	545	349	392	349	327	.	2050	
0.50 - 0.99	.	174	174	305	479	283	893	871	588	370	588	22	4747	
1.00 - 1.49	.	.	22	153	283	109	414	414	87	.	87	.	1569	
1.50 - 1.99	.	.	22	109	131	44	65	65	327	44	131	.	938	
2.00 - 2.49	.	.	.	22	22	.	.	109	109	.	44	.	306	
2.50 - 2.99	65	65	.	.	130	
3.00 - 3.49	22	.	22	22	22	22	22	.	132	
3.50 - 3.99	22	.	22	.	22	.	66	
4.00 - 4.49	22	22	.	.	.	.	44	
4.50 - 4.99	22	.	.	.	22	
5.00 - Greater	0	
Total	22	174	218	589	959	480	1983	1852	1634	850	1221	22		

May 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	22	67	22	133	177	155	953	421	288	155	310	.	2703	
0.50 - 0.99	.	89	177	244	576	486	1375	754	488	22	200	.	4391	
1.00 - 1.49	.	.	22	222	133	200	643	200	177	.	133	.	1730	
1.50 - 1.99	.	.	22	67	44	22	133	89	133	67	111	22	710	
2.00 - 2.49	22	22	22	22	22	89	44	.	243	
2.50 - 2.99	22	.	.	.	44	22	67	.	155	
3.00 - 3.49	22	44	.	66	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	22	156	243	666	974	865	3126	1486	1152	377	909	22		

June 1985-1988, Gage 111														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	43	279	64	107	365	579	1502	536	386	236	258	.	4355	
0.50 - 0.99	21	150	279	300	494	343	1395	944	172	193	21	.	4312	
1.00 - 1.49	.	21	86	172	300	150	129	43	86	.	21	.	1008	
1.50 - 1.99	.	.	21	43	43	43	43	21	43	.	.	.	257	
2.00 - 2.49	.	.	.	.	.	.	43	.	21	.	.	.	64
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	64	450	450	622	1202	1115	3112	1544	708	429	300	0		

(Continued)

(Sheet 2 of 4)

Table C4 (Continued)
Monthly Joint Distribution of H_{mo} versus T_p (All Years)

July 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	22	66	110	44	241	724	2083	877	746	307	548	22	5790
0.50 - 0.99	.	263	307	373	197	526	1360	439	132	44	132	.	3773
1.00 - 1.49	.	.	66	88	66	22	22	22	44	.	.	.	330
1.50 - 1.99	22	22	44	22	.	.	.	.	110
2.00 - 2.49	0
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	22	329	483	505	526	1294	3509	1360	922	351	680	22	

August 1985-1988, Gage 111													
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	92	69	139	231	323	1039	508	393	139	185	.	3118
0.50 - 0.99	.	231	139	993	855	162	1016	624	208	208	323	.	4759
1.00 - 1.49	.	.	231	462	139	115	323	46	139	23	23	.	1501
1.50 - 1.99	.	.	.	139	46	46	.	46	46	92	.	.	415
2.00 - 2.49	23	.	46	92	23	.	.	184
2.50 - 2.99	23	.	.	.	.	.	23
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	323	439	1733	1271	669	2401	1270	878	485	531	0	

September 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period													Total
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	24	24	24	165	376	329	706	47	329	.	2024
0.50 - 0.99	.	71	165	400	541	353	941	1176	847	212	306	.	5012
1.00 - 1.49	.	24	47	306	259	353	447	235	282	118	118	.	2189
1.50 - 1.99	.	.	.	118	165	212	94	47	47	.	.	.	683
2.00 - 2.49	47	47	.	.	.	.	.	.	94
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	95	236	848	1036	1130	1858	1787	1882	377	753	0	

(Continued)

(Sheet 3 of 4)

Table C4 (Concluded)
Monthly Joint Distribution of H_{mo} versus T_p (All Years)

October 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	.	43	21	21	86	236	215	150	107	215	.	1094	
0.50 - 0.99	.	86	300	343	515	386	1009	815	794	86	472	.	4806	
1.00 - 1.49	.	21	322	494	172	86	107	322	558	.	129	.	2211	
1.50 - 1.99	.	.	21	300	279	43	86	107	236	21	64	.	1157	
2.00 - 2.49	64	86	43	21	150	.	.	.	364	
2.50 - 2.99	43	21	21	86	.	.	.	171	
3.00 - 3.49	43	86	43	.	.	.	.	172	
3.50 - 3.99	21	.	.	.	.	.	21	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	107	686	1158	1051	773	1609	1544	1974	214	880	0		

November 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	44	66	88	22	221	442	155	155	133	177	.	1503	
0.50 - 0.99	22	133	354	531	597	531	863	465	398	199	420	.	4513	
1.00 - 1.49	.	22	199	708	442	354	288	66	133	66	155	.	2433	
1.50 - 1.99	.	.	.	177	265	88	66	66	133	.	44	.	839	
2.00 - 2.49	.	.	.	44	22	111	199	66	88	.	.	.	530	
2.50 - 2.99	22	.	22	.	.	.	.	44	
3.00 - 3.49	22	.	44	44	.	.	.	110	
3.50 - 3.99	0	
4.00 - 4.49	22	.	.	.	22	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	22	199	619	1548	1348	1349	1858	884	973	398	796	0		

December 1985-1988, Gage 111 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	197	25	123	98	74	442	541	319	246	369	.	2434	
0.50 - 0.99	25	123	344	688	418	418	516	688	639	147	418	25	4449	
1.00 - 1.49	.	49	.	585	418	147	123	172	295	49	147	.	1965	
1.50 - 1.99	.	.	.	98	319	25	.	25	74	74	172	.	787	
2.00 - 2.49	74	.	.	.	25	98	25	.	222	
2.50 - 2.99	49	.	25	.	74	
3.00 - 3.49	25	.	25	.	.	.	.	50	
3.50 - 3.99	25	.	.	.	.	.	25	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	25	369	369	1474	1327	889	1106	1451	1401	614	1156	25		

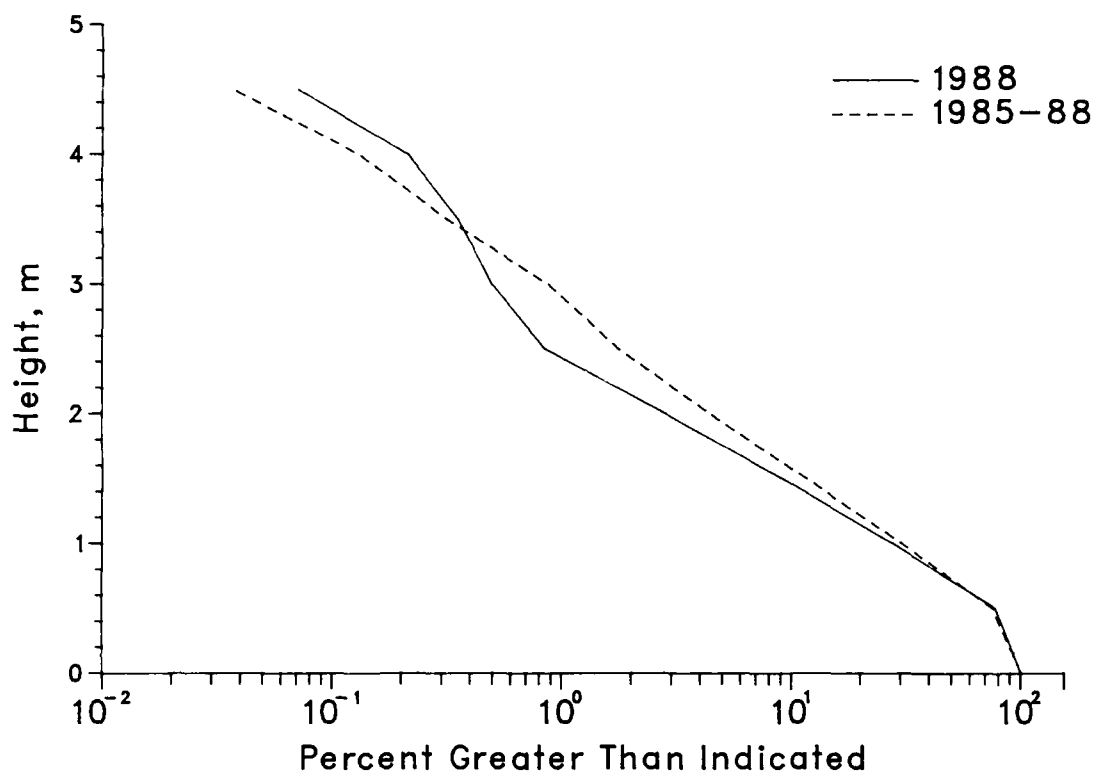


Figure C2. Annual cumulative wave height distributions
for Gage 111

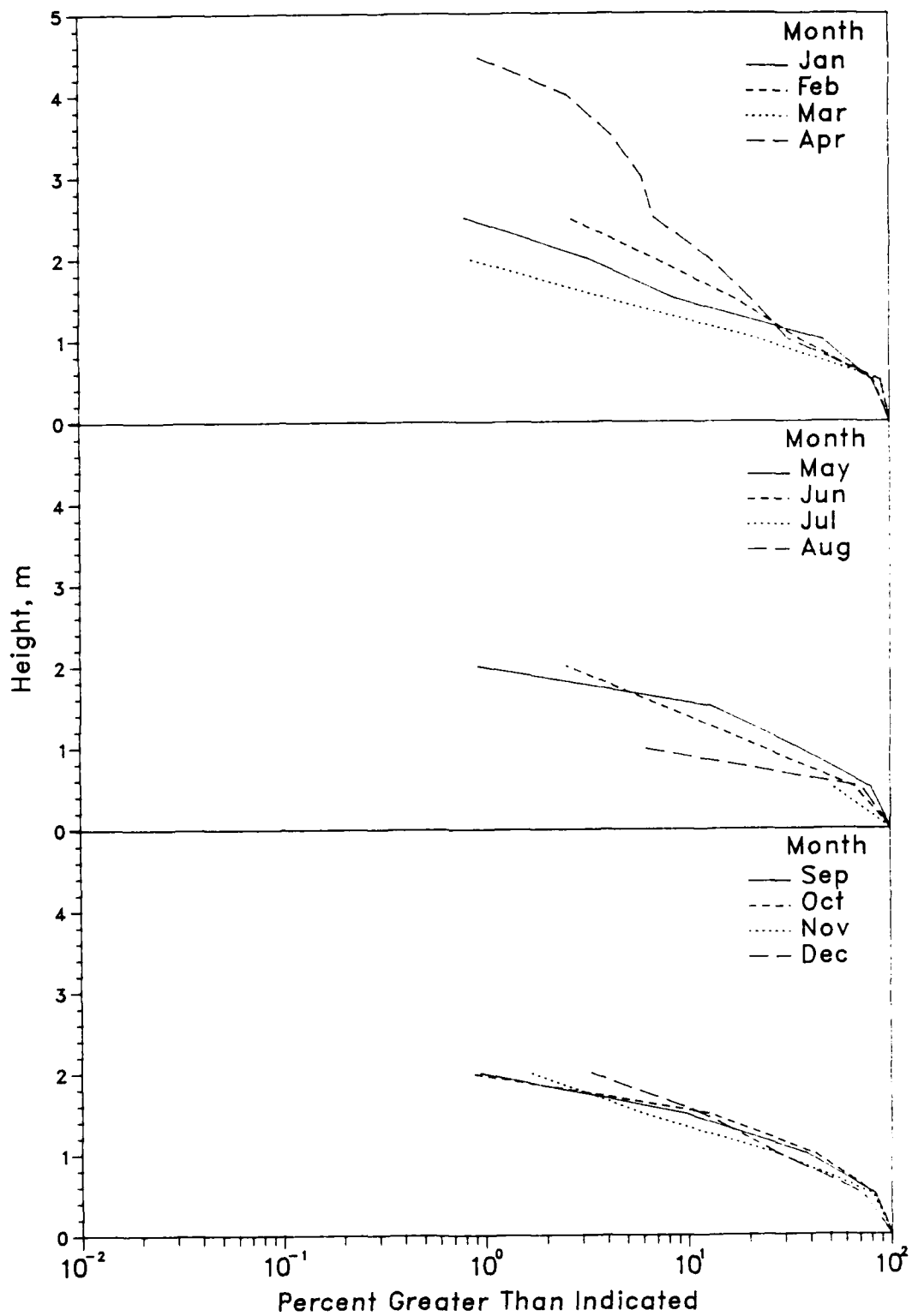


Figure C3. 1988 monthly wave height distributions
for Gage 111

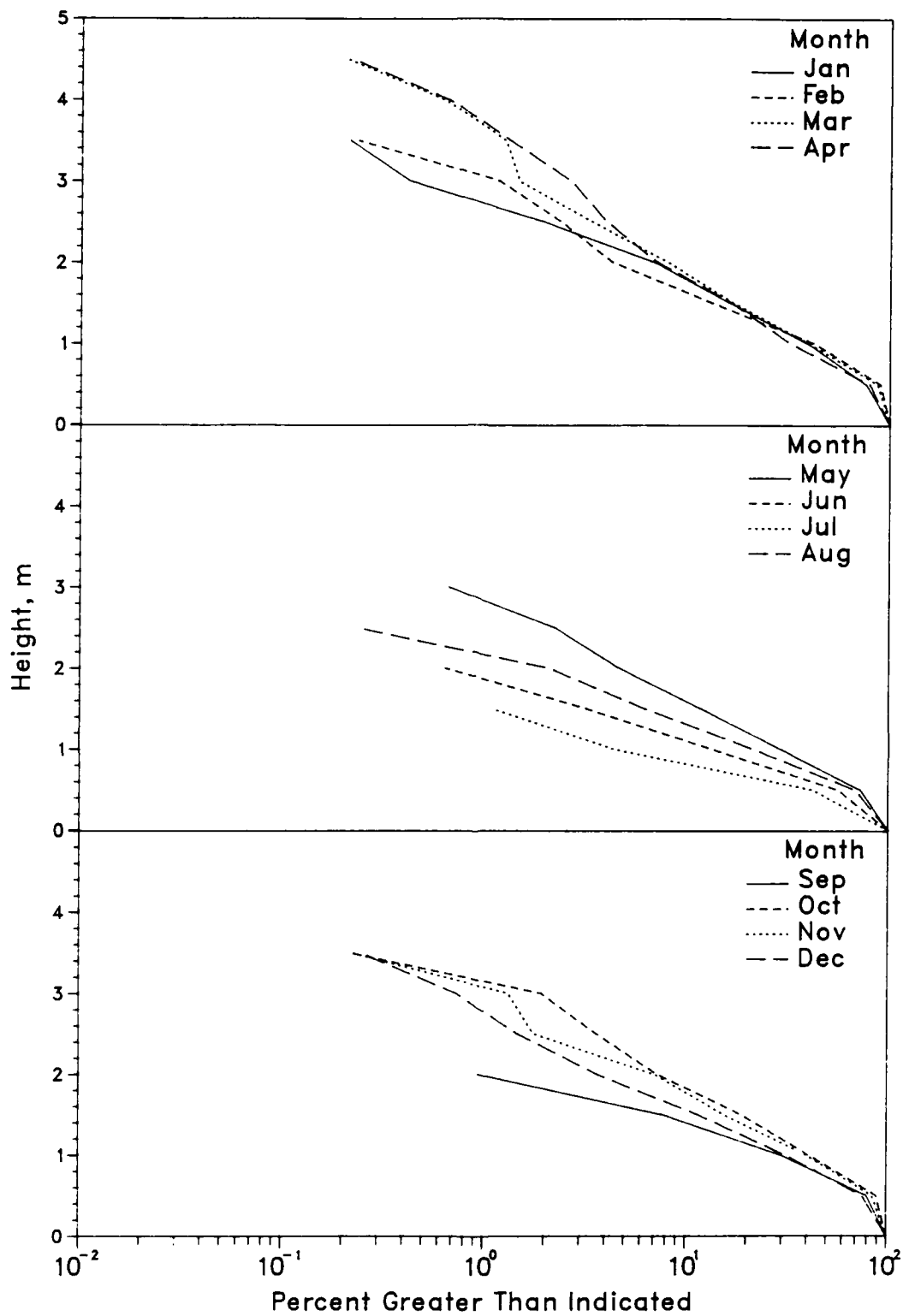


Figure C4. 1985-1988 monthly wave height distributions for Gage 111

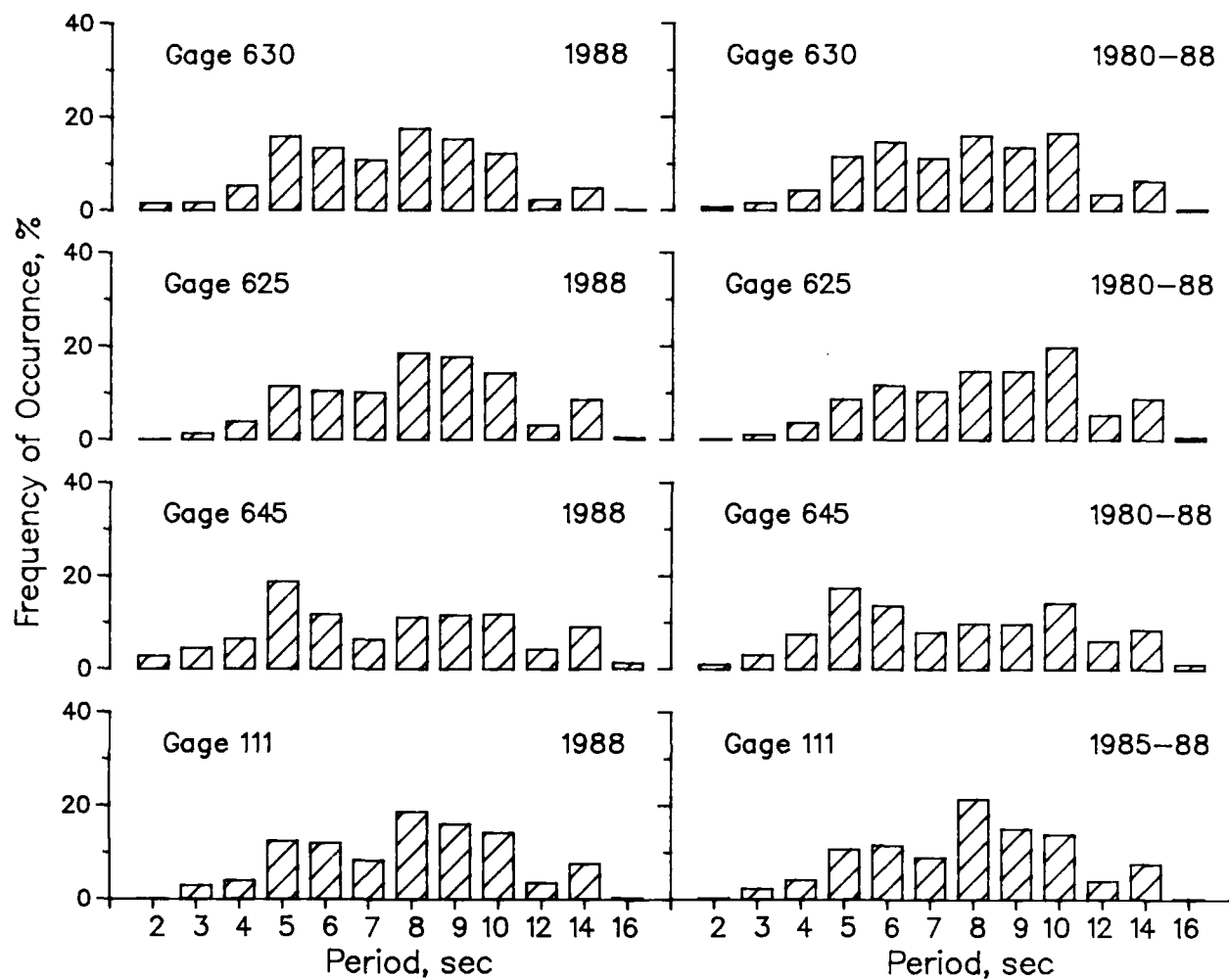


Figure C5. Annual wave period distributions for all gages

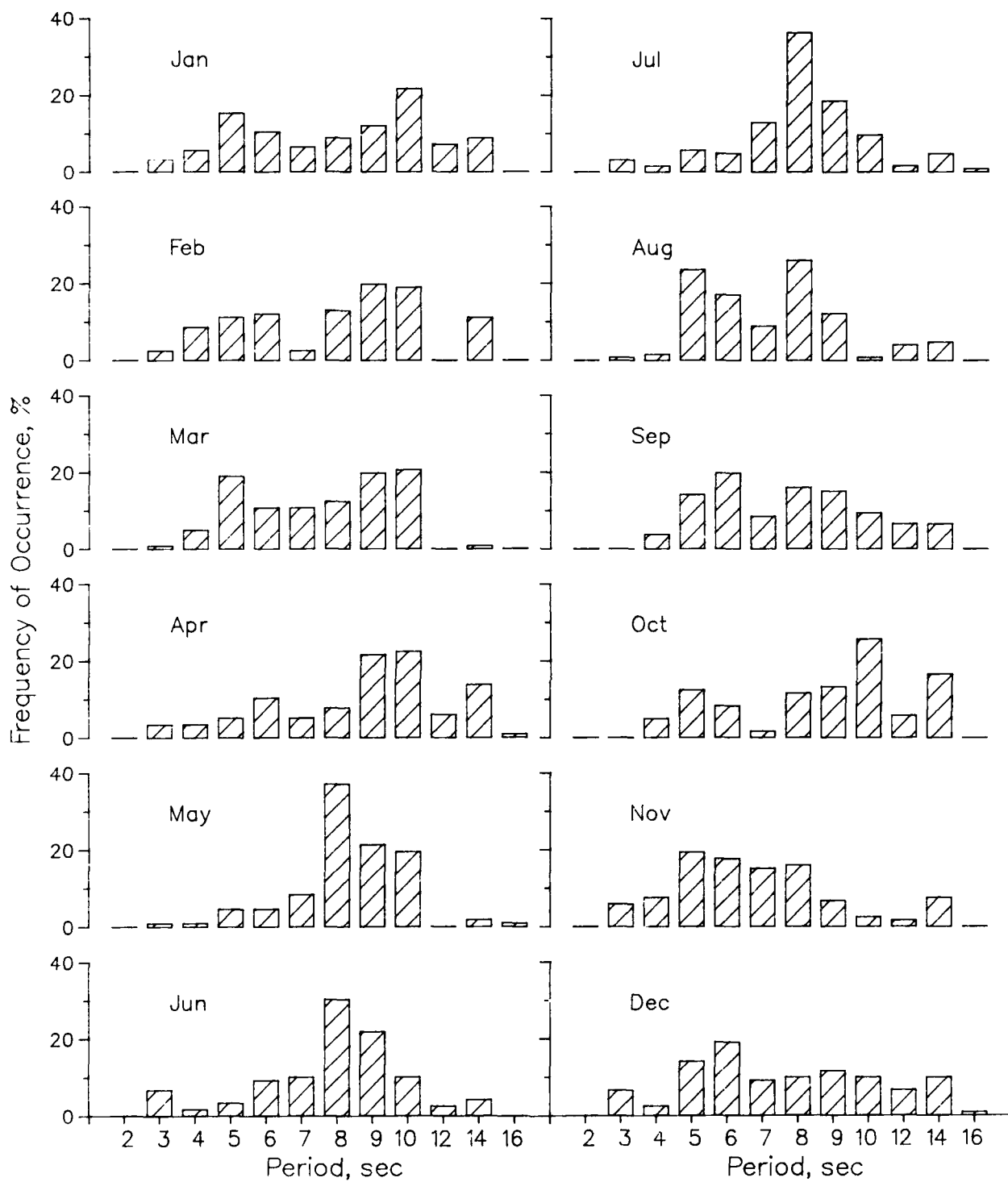


Figure C6. 1988 monthly wave period distributions for Gage 111

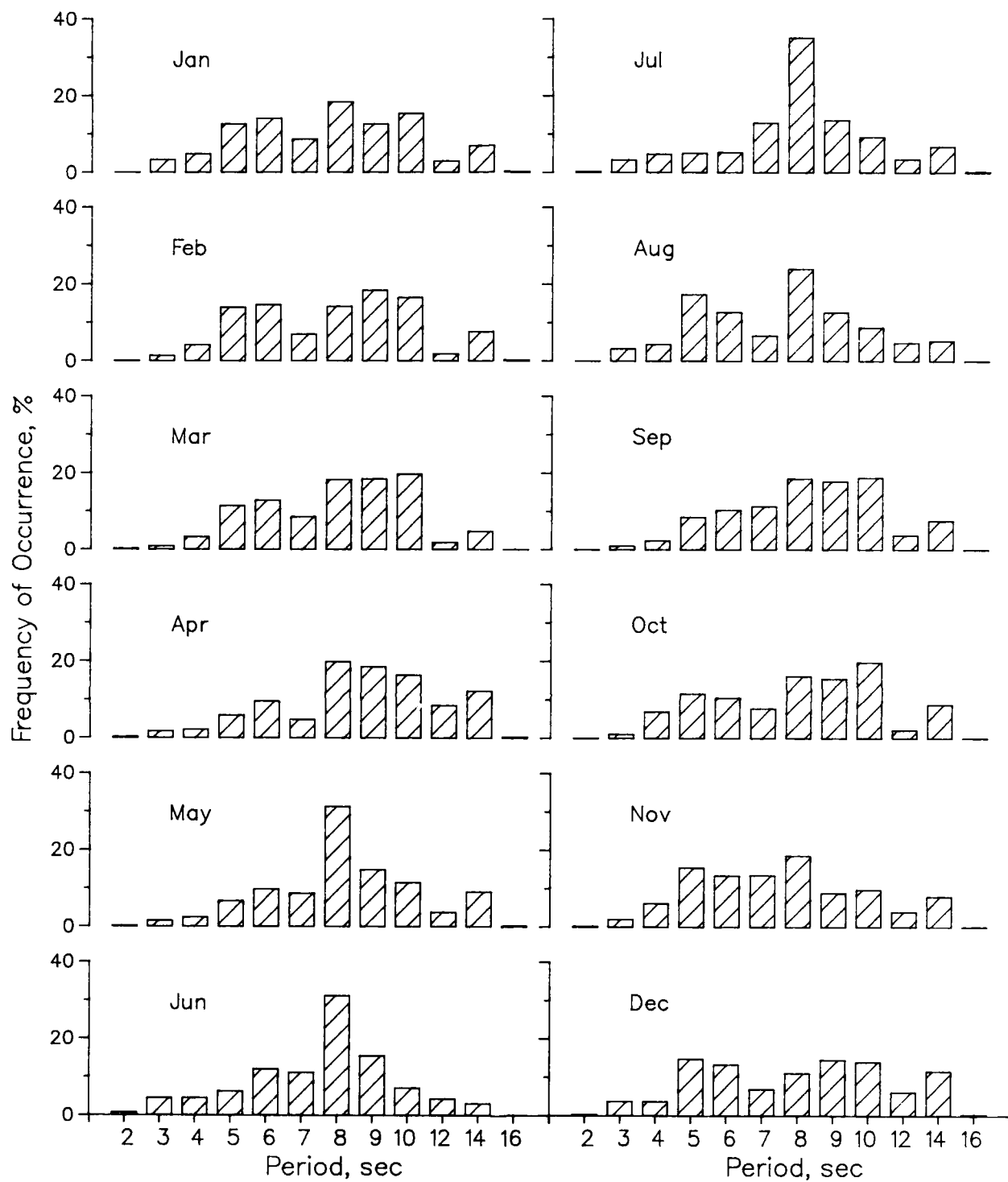


Figure C7. 1985-1988 monthly wave period distributions for Gage 111

Table C5
1988 Persistence of H_{mo} for Gage 111

Height (m)	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	27	22		20		18	16	15	14	13		12				10			9
1.0	43	29	20	14	10	6		5		3					1				
1.5	36	16	6	3															
2.0	16	5	1																
2.5	4		1																
3.0	2		1																
3.5		1																	
4.0	1																		

Table C6
1985 Through 1988 Persistence of H_{mo} for Gage 111

Height (m)	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	29	26	22	21	18	17	15	14	13	12	10	9			7	6			5
1.0	50	35	23	15	10	8	6	3	2	1									
1.5	35	18	8	4	2		1												
2.0	16	8	3		1														
2.5	8	4	2			1													
3.0	5	2																	
3.5	2	1																	
4.0	1																		

* Data from gage 640 from 1985 and 1986 as well as data from gage 141 for 1987 was used for comparison with gage 111.

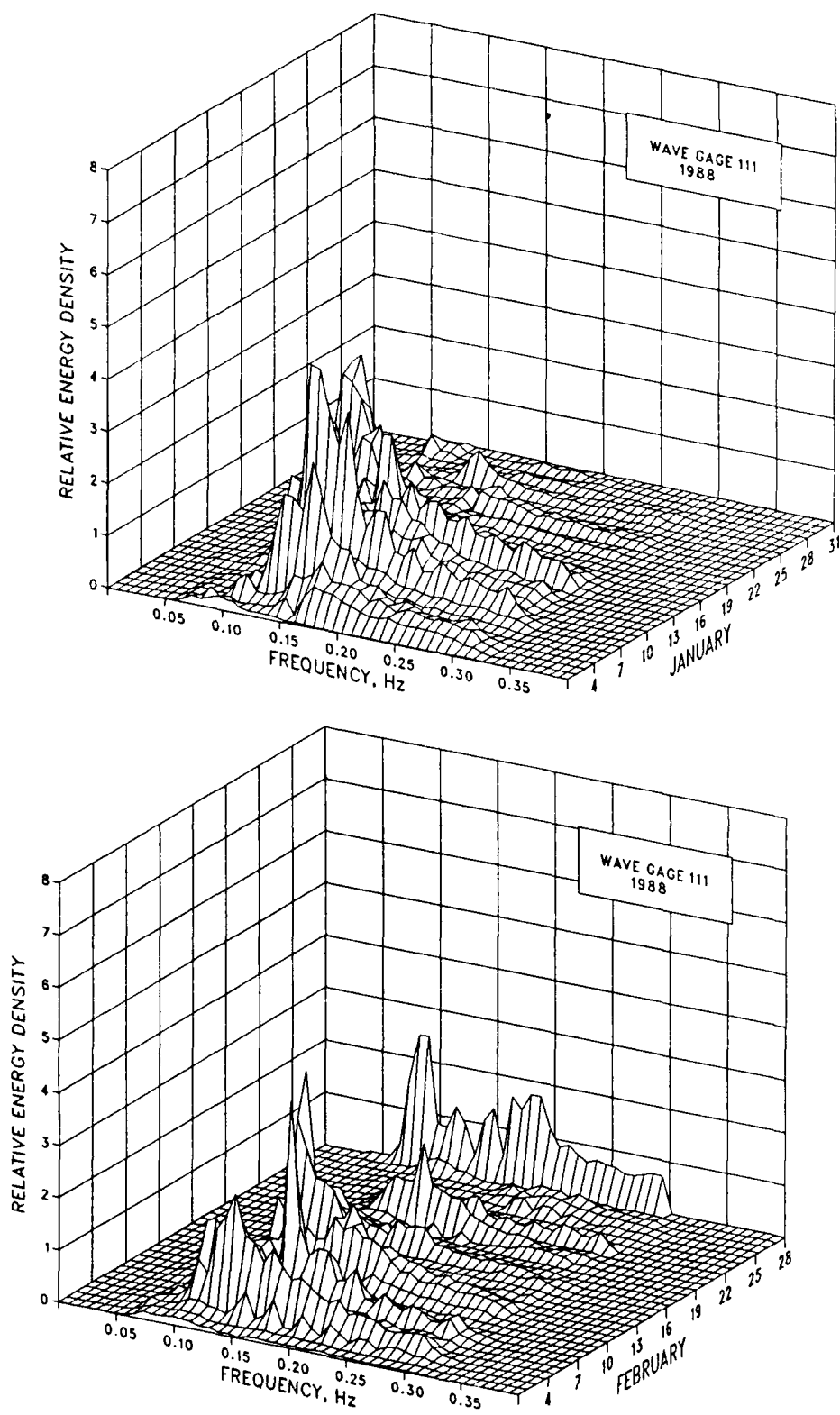


Figure C8. 1988 monthly spectra for Gage 111
(Sheet 1 of 6)

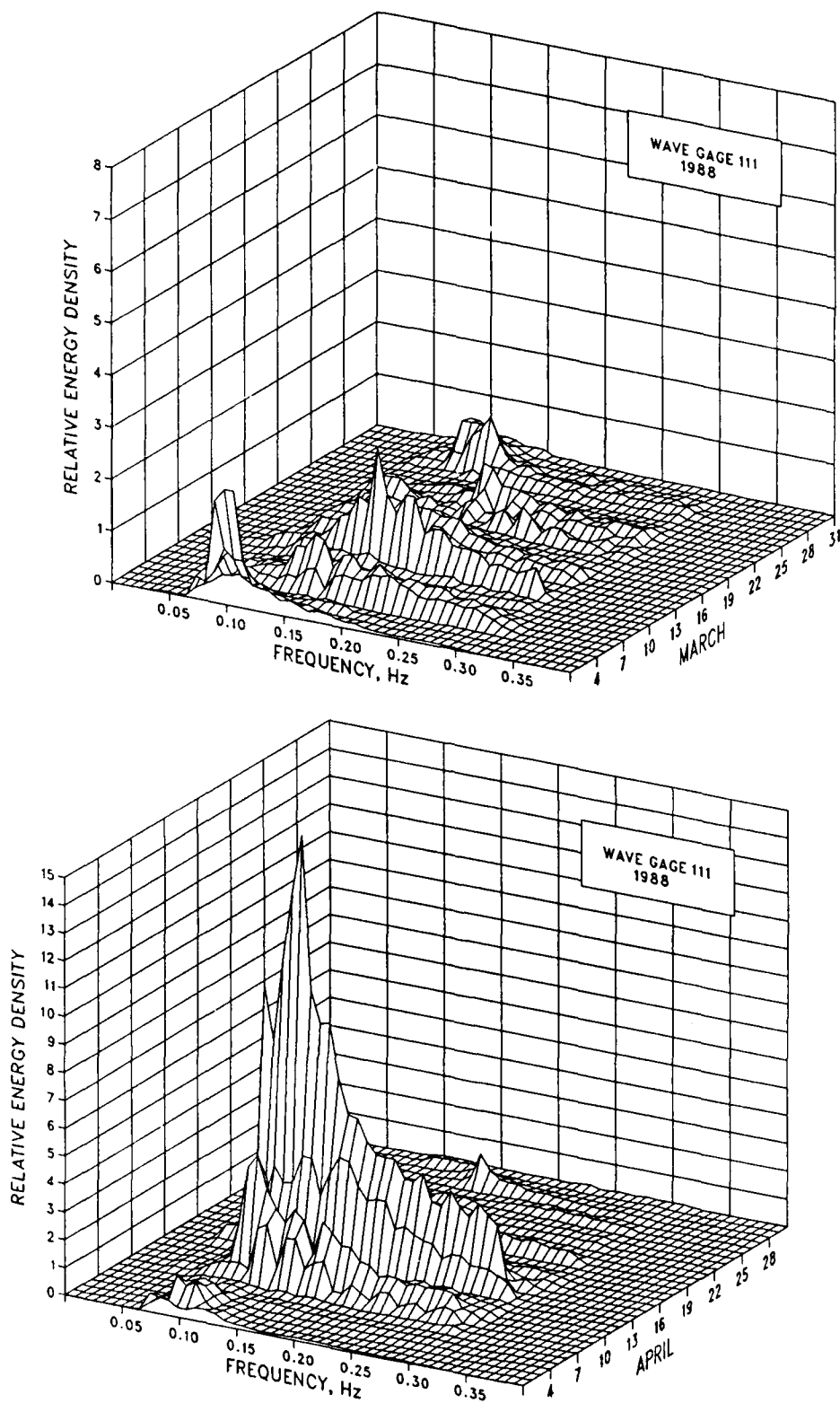


Figure C8. (Sheet 2 of 6)

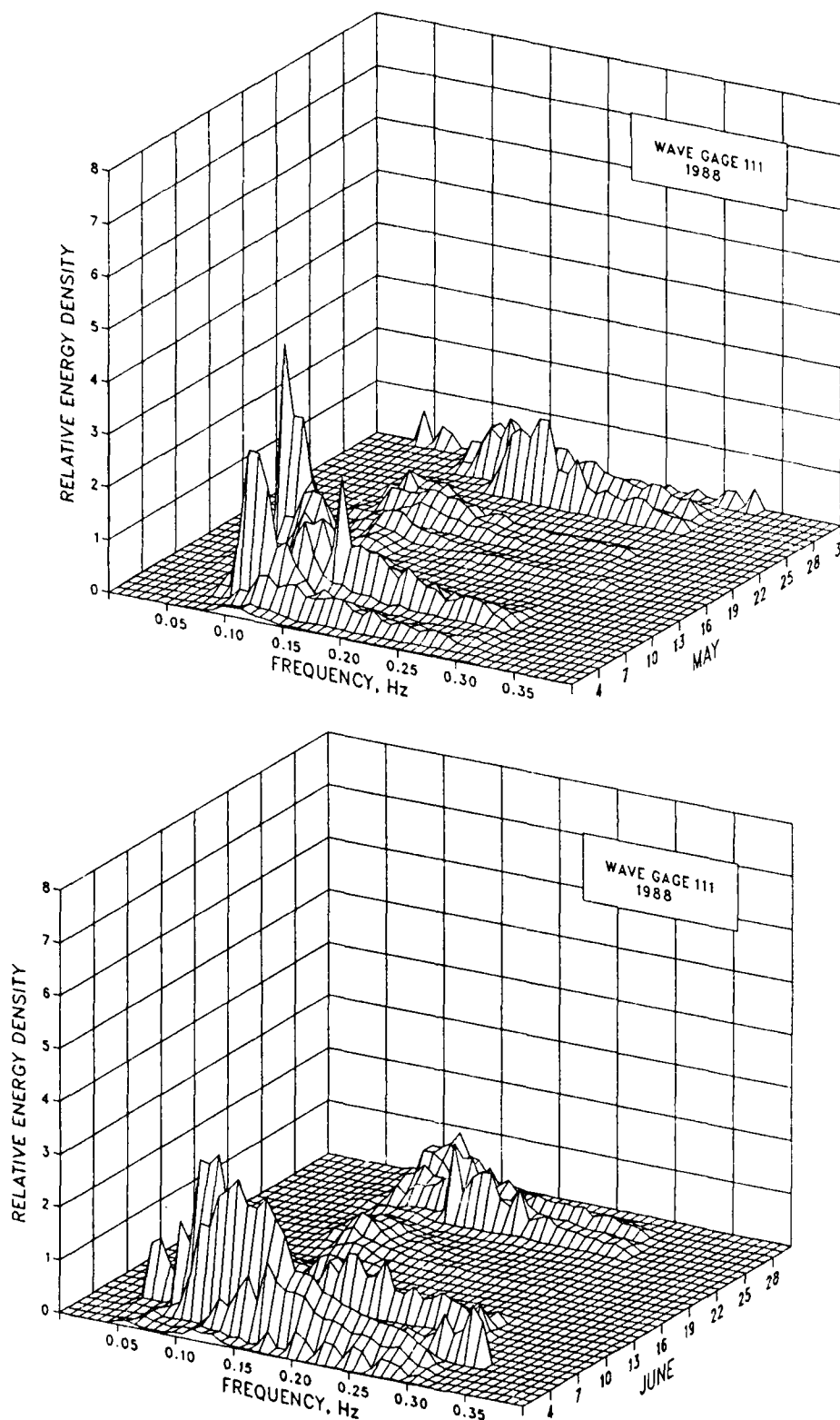


Figure C8. (Sheet 3 of 6)

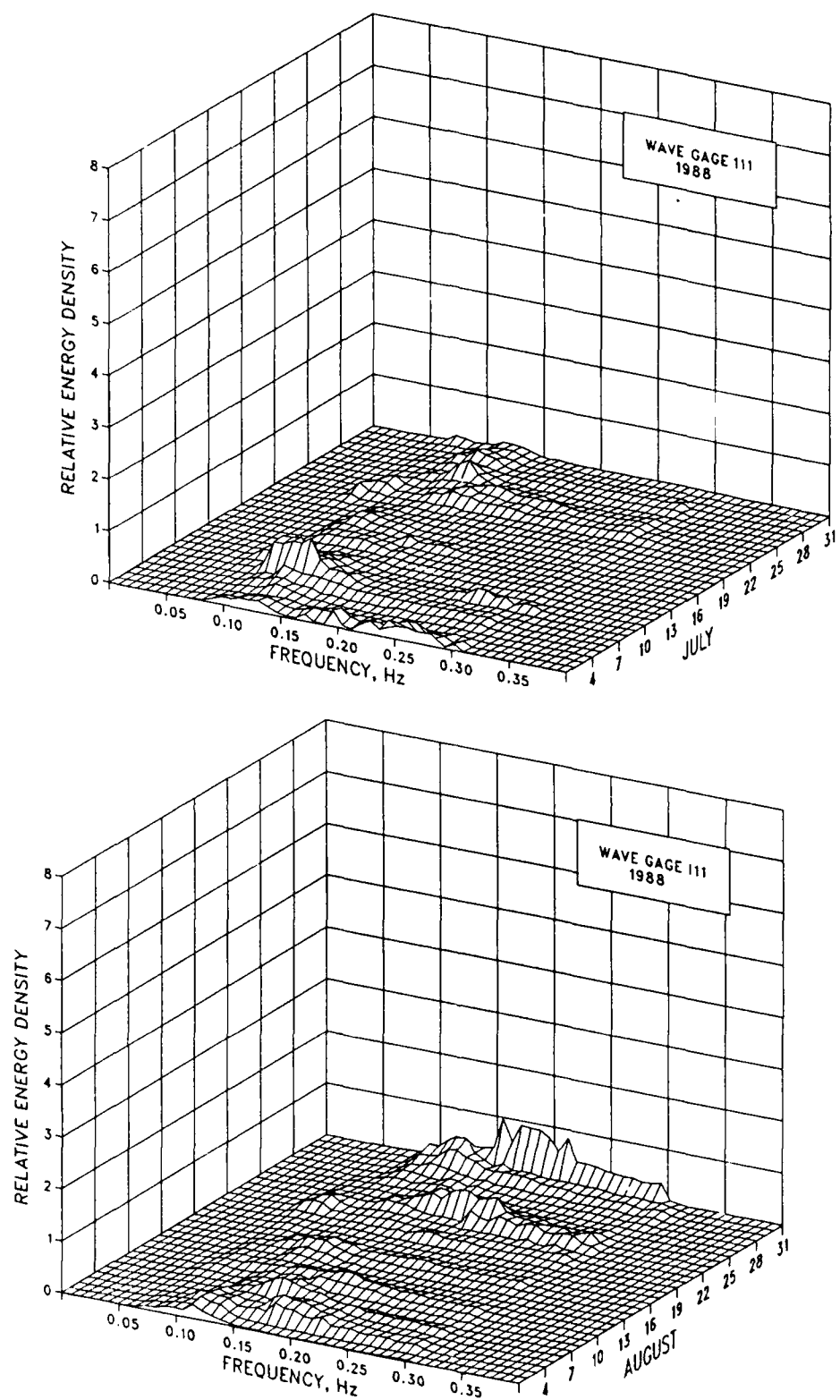


Figure C8. (Sheet 4 of 6)

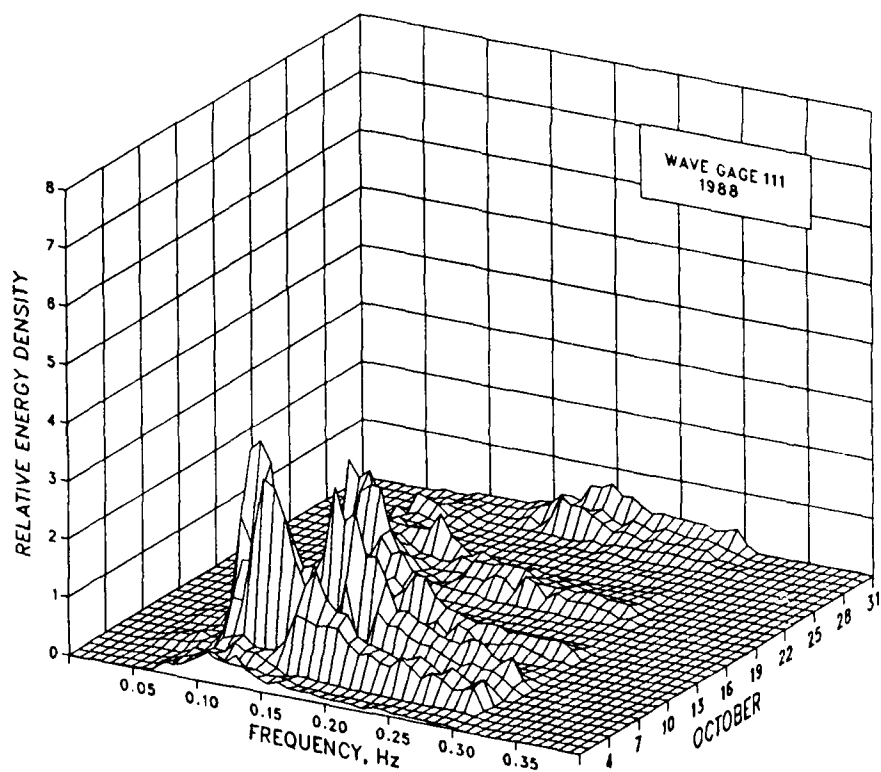
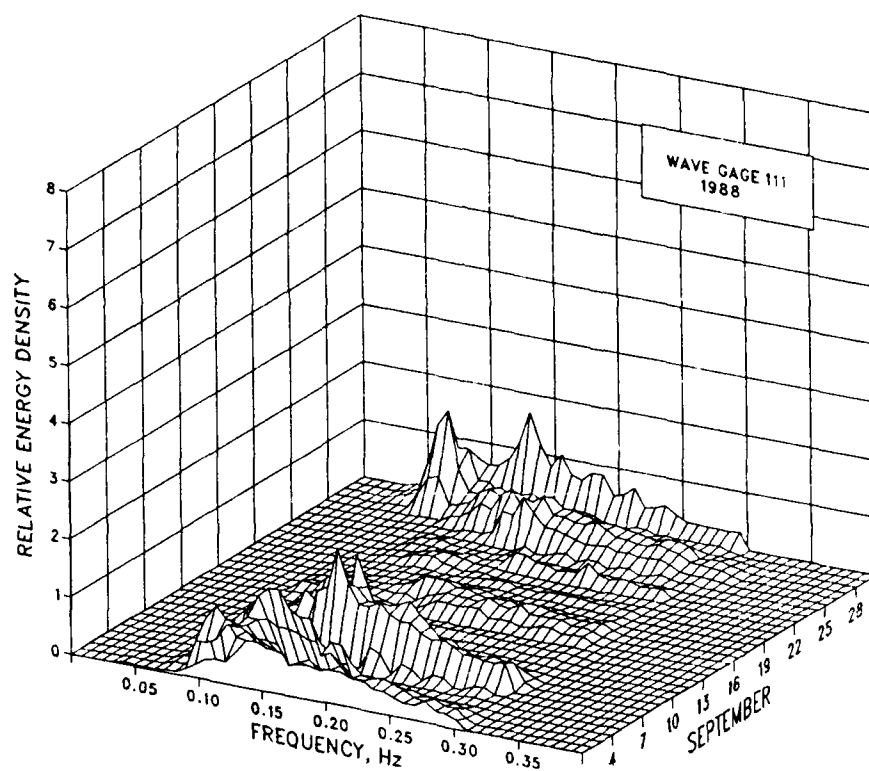


Figure C8. (Sheet 5 of 6)

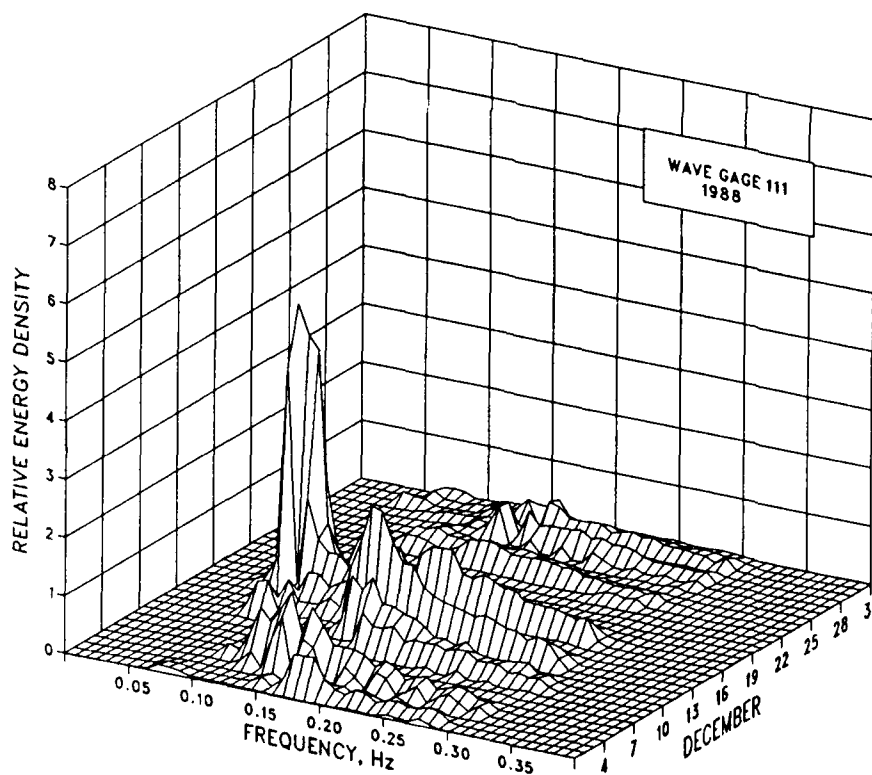
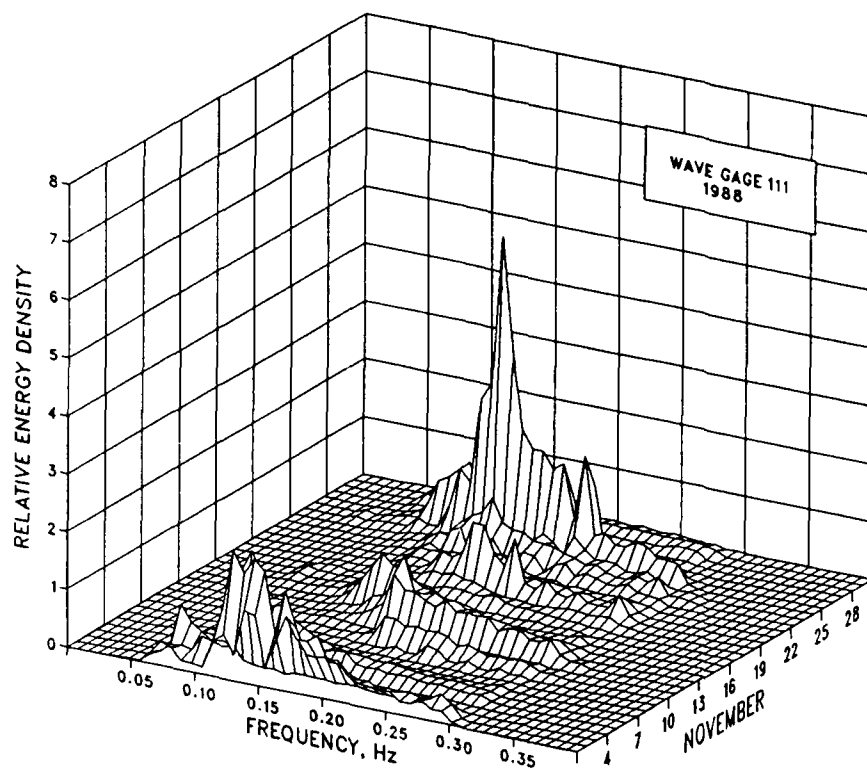


Figure C8. (Sheet 6 of 6)

Table C7
Wave Statistics for Gage 111

Month	1988							1985-1988						
	Height				Period			Height				Period		
	Mean	Std. Dev.	Extreme	Date	Mean	Std. Dev.	Number	Mean	Std. Dev.	Extreme	Date	Mean	Std. Dev.	Number
m	m	m	sec	sec	Obs.	m	m	m	sec	sec	Obs.			
Jan	1.0	0.5	2.6	14	8.9	3.1	124	1.0	0.6	3.8	1987	8.4	2.7	475
Feb	1.0	0.6	2.8	28	8.6	2.8	116	1.1	0.6	3.9	1987	8.6	2.6	430
Mar	0.9	0.4	2.2	11	8.2	2.2	121	1.1	0.7	4.5	1987	8.7	2.4	483
Apr	1.2	0.9	4.8	13	9.7	3.1	116	1.0	0.7	4.8	1988	9.6	2.8	459
May	0.9	0.5	2.1	9	9.0	2.2	108	0.9	0.6	3.3	1986	9.0	2.6	451
Jun	0.8	0.5	2.3	4	8.4	2.2	119	0.7	0.4	2.3	1986	8.2	2.4	466
Jul	0.6	0.2	1.0	1	8.7	2.5	124	0.6	0.3	1.9	1986	8.6	2.5	456
Aug	0.7	0.3	1.4	31	7.9	2.4	123	0.8	0.5	2.8	1985	8.2	2.7	433
Sep	0.9	0.5	2.0	8	8.5	2.7	106	0.9	0.4	2.2	1986	9.0	2.4	425
Oct	1.0	0.5	2.4	4	9.6	2.8	121	1.1	0.7	3.5	1987	8.7	2.6	466
Nov	0.9	0.4	2.2	24	7.4	2.5	119	1.1	0.6	4.1	1985	8.2	2.8	452
Dec	0.8	0.5	2.2	16	8.6	3.3	121	0.9	0.6	3.6	1986	8.9	3.3	407
Annual	0.9	0.5	4.8	Apr	8.6	2.8	1418	0.9	0.6	4.8	Apr 1988	8.7	2.7	54

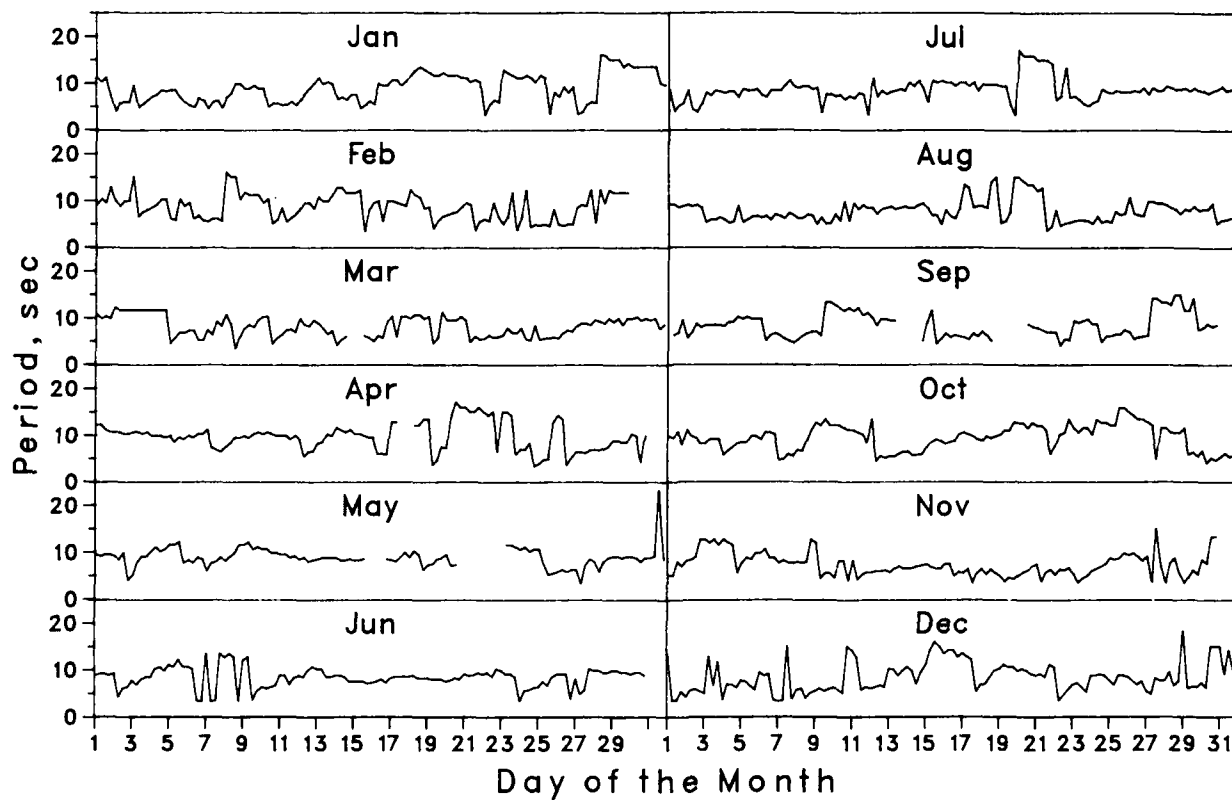
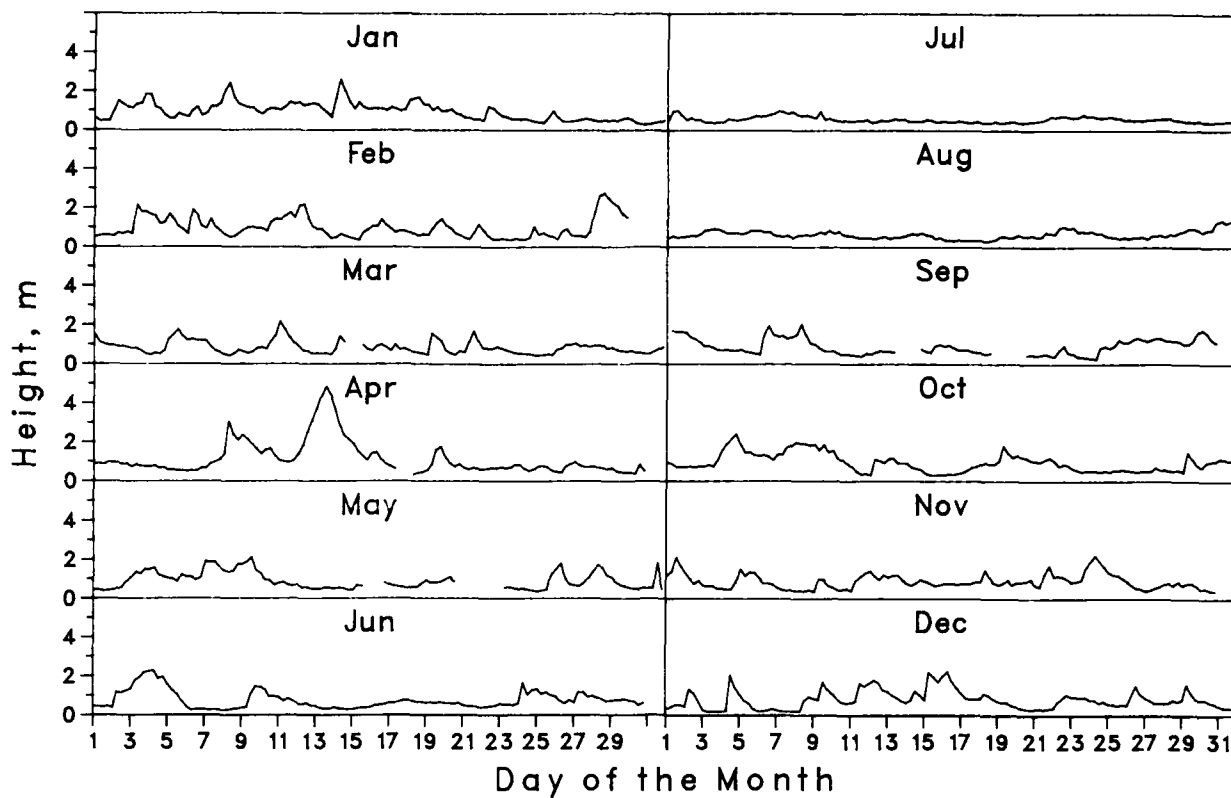


Figure C9. Time-histories of wave height and period
for Gage 111

APPENDIX D: WAVE DATA FOR GAGE 625

1. Wave data summaries for Gage 625 are presented for 1988 and for 1980 through 1988 in the following forms:

Daily H_{m0} and T_p

2. Figure D1 displays the individual wave height and peak spectral wave period values along with the monthly mean values.

Joint Distributions of H_{m0} and T_p

3. Annual and monthly joint distributions tables are presented in Tables D1 and D2, and data for 1980 through 1988 are in Tables D3 and D4. Each table gives the frequency (in parts per 10,000) for which the wave height and peak period were within the specified intervals; these values can be converted to percent by dividing by 100. Marginal totals are also included. The row total gives the total number of observations out of 10,000 which fell within each specified peak period interval. The column total gives the number of observations out of 10,000 which fell within each specified wave height interval.

Cumulative Distributions of Wave Height

4. Annual and monthly wave height distributions for 1988 are plotted in cumulative form in Figures D2 and D3. Data for 1980 through 1988 are in Figure D4.

Peak Spectral Wave Period Distributions

5. Annual and monthly peak wave period, T_p , distribution histograms for 1988 are presented in Figures D5 and D6. Data for 1980 through 1988 are in Figure D7.

Persistence of Wave Heights

6. Table D5 shows the number of times in 1988 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1980 through 1988 are given in Table D6. An example is shown below:

Height m	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	18	15		14	13	12		11	10	9				8		7			
1.0	50	34	24	21	18	14	12	8	7	3			2						
1.5	41	19	8	6	2	1													
2.0	22	9	5	1															
2.5	10	5	2																
3.0	6	1																	
3.5		1																	
4.0	1																		

This example indicates that wave heights equaled or exceeded 1.0 m 50 times for at least 1 day; 34 times for at least 2 days; 24 times for at least 3 days, etc. Therefore, on 16 occasions the height equaled or exceeded 1.0 m for 1 day exactly ($50 - 34 = 16$); on 10 occasions for 2 days; on 3 occasions for 3 days, etc. Note that the height exceeded 1 m 50 times for 1 day or longer, while heights exceeded 0.5 m only 18 times for this same duration. This change in durations occurred because the longer durations of lower waves may be interspersed with shorter, but more frequent, intervals of higher waves. For example, one of the times that the wave heights exceeded 0.5 m for 16 days may have represented 3 times the height exceeded 1 m for shorter durations.

Spectra

7. Monthly spectra for the offshore Waverider buoy (Gage 625) are presented in Figure D8. The plots show "relative" energy density as a function of wave frequency. These figures summarize the large number of spectra for each month. The figures emphasize the higher energy density associated with storms as well as the general shifts in energy density to different frequencies. As used here, "relative" indicates the spectra have been smoothed by the three-dimension surface drawing routine. Consequently, extremely high- and low-energy density values are modified to produce a smooth

surface. The figures are not intended for quantitative measurements; however, they do provide the energy density as a function of frequency relative to the other spectra for the month.

8. Monthly and annual wave statistics for Gage 625 for 1988 and for 1980 through 1988 are presented in Table D7.

9. Figure D9 plots monthly time histories of wave height and period.

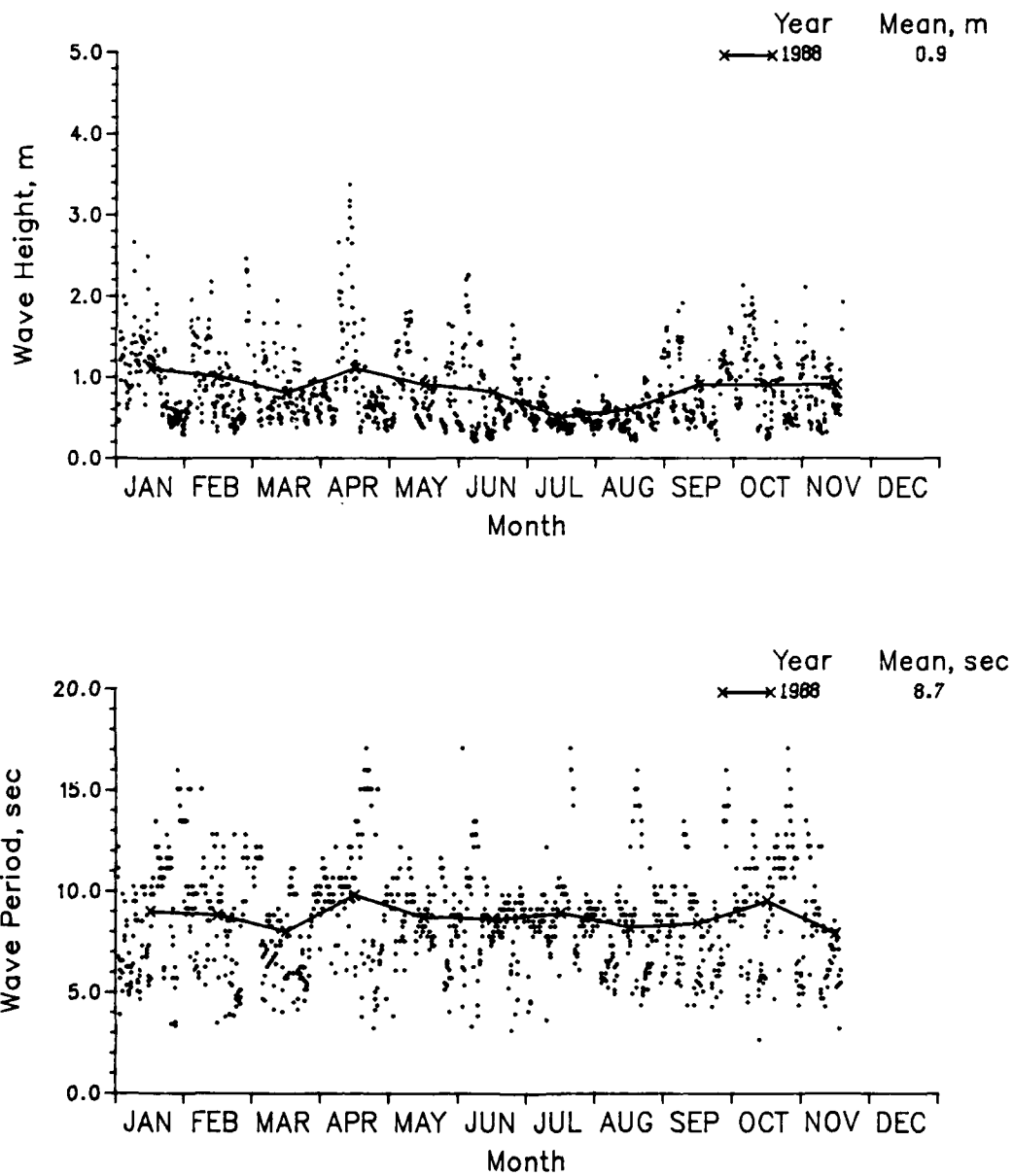


Figure D1. 1988 daily wave height and period values with monthly means for Gage 625

Table D1

Annual Joint Distribution of H_{m0} versus T_p

Annual 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	8	16	48	96	120	343	799	655	375	120	391	16	2987	
0.50 - 0.99	.	112	216	559	415	431	783	807	647	112	319	16	4417	
1.00 - 1.49	.	8	112	423	296	184	152	216	216	56	80	.	1743	
1.50 - 1.99	.	.	16	72	168	40	72	64	136	24	24	.	616	
2.00 - 2.49	40	8	32	32	32	.	16	.	160	
2.50 - 2.99	8	8	16	.	8	.	8	.	48	
3.00 - 3.49	16	.	8	.	24	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	8	136	392	1150	1047	1014	1854	1774	1430	312	846	32		

Table D2
Monthly Joint Distribution of H_{mo} versus T_p

January 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	.	.	81	81	81	.	242	403	403	403	.	1694	
0.50 - 0.99	.	323	.	403	323	161	242	161	1048	242	242	.	3145	
1.00 - 1.49	.	.	161	1048	484	242	403	565	726	.	242	.	3871	
1.50 - 1.99	.	.	.	161	242	81	81	81	81	161	81	.	969	
2.00 - 2.49	161	81	.	.	.	.	.	.	242	
2.50 - 2.99	81	.	.	.	.	.	.	81	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	323	161	1693	1291	727	726	1049	2258	806	968	0		

February 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	86	259	.	172	.	517	172	86	.	431	.	1723	
0.50 - 0.99	.	259	345	690	86	259	517	948	1121	86	603	.	4914	
1.00 - 1.49	.	.	.	431	431	86	172	431	259	.	.	.	1810	
1.50 - 1.99	345	86	172	172	172	.	86	.	1033	
2.00 - 2.49	86	172	86	.	172	.	516	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	345	604	1121	1034	431	1464	1895	1724	86	1292	0		

March 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	.	.	413	83	248	331	413	413	.	83	.	1984	
0.50 - 0.99	.	.	248	826	661	744	1074	1074	1074	.	248	.	5949	
1.00 - 1.49	.	.	413	413	331	331	.	.	248	.	.	.	1736	
1.50 - 1.99	.	.	.	83	248	.	.	.	.	.	.	.	331
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	0	661	1735	1323	1323	1405	1487	1735	0	331	0		

(Continued)

(Sheet 1 of 4)

Table D2 (Continued)
Monthly Joint Distribution of H_{mo} versus T_p

April 1988, Gage 625 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	86	86	690	172	.	517	.	1551
0.50 - 0.99	.	172	345	259	862	517	86	862	1207	259	1034	86	5689
1.00 - 1.49	.	.	.	86	86	172	.	172	345	.	.	.	775
1.50 - 1.99	.	.	86	.	86	.	86	172	431	.	.	.	861
2.00 - 2.49	86	.	86	86	172	.	.	.	430
2.50 - 2.99	86	.	172	.	86	.	86	.	430
3.00 - 3.49	172	.	86	.	258
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	172	431	345	1120	775	516	1982	2585	259	1723	86	

May 1988, Gage 625 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	.	.	88	.	442	973	796	796	.	.	.	3095
0.50 - 0.99	.	88	88	88	354	796	973	1150	354	.	88	.	3979
1.00 - 1.49	.	.	.	177	177	354	531	619	177	.	.	.	2035
1.50 - 1.99	.	.	.	88	177	88	177	88	265	.	.	.	883
2.00 - 2.49	0
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	88	88	441	708	1680	2654	2653	1592	0	88	0	

June 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	84	84	.	84	588	1008	756	252	168	588	84	3696	
0.50 - 0.99	.	252	.	84	84	252	1765	1345	252	.	.	.	4034	
1.00 - 1.49	.	.	168	252	672	252	84	.	84	.	.	84	1596	
1.50 - 1.99	.	.	.	84	84	.	.	.	252	.	.	.	420	
2.00 - 2.49	84	.	84	84	84	.	.	.	336	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	336	252	420	1008	1092	2941	2185	924	168	588	168		

(Continued)

(Sheet 2 of 4)

Table D2 (Continued)
Monthly Joint Distribution of H_{mo} versus T_p

July 1988, Gage 625 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	83	167	833	2250	1667	667	.	500	83	6250
0.50 - 0.99	.	83	250	83	583	417	1250	833	.	83	83	.	3665
1.00 - 1.49	0
1.50 - 1.99	0
2.00 - 2.49	0
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	83	250	166	750	1250	3500	2500	667	83	583	83	

August 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	.	81	163	488	976	1707	813	244	325	325	.	5122	
0.50 - 0.99	.	.	244	1545	650	163	894	488	163	244	163	.	4554	
1.00 - 1.49	.	.	.	325	.	.	.	.	.	.	.	.	325
1.50 - 1.99	0	
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	0	325	2033	1138	1139	2601	1301	407	569	488	0	0	

September 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	.	90	90	180	270	631	901	90	.	360	.	2612	
0.50 - 0.99	.	.	360	901	270	541	631	631	180	180	360	.	4054	
1.00 - 1.49	.	.	.	631	631	450	180	.	.	541	180	.	2613	
1.50 - 1.99	.	.	.	90	270	90	180	90	.	.	.	.	720
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	0	450	1712	1351	1351	1622	1622	270	721	900	0		

(Continued)

(Sheet 3 of 4)

Table D2 (Concluded)
Monthly Joint Distribution of H_m versus T_p

October 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	83	.	.	83	.	83	248	331	661	331	579	.	2399	
0.50 - 0.99	.	.	83	496	165	.	496	909	1240	.	331	83	3803	
1.00 - 1.49	.	.	331	744	248	.	.	413	413	83	413	.	2645	
1.50 - 1.99	.	.	83	165	248	.	83	83	248	83	83	.	1076	
2.00 - 2.49	83	.	.	.	.	.	83	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	83	0	497	1488	661	83	910	1736	2562	497	1406	83	0	

November 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	1176	294	294	.	588	.	2352	
0.50 - 0.99	.	.	588	882	588	1324	588	294	294	147	441	.	5148	
1.00 - 1.49	.	147	147	588	294	147	441	147	.	.	.	.	1911
1.50 - 1.99	.	.	.	147	147	147	.	.	.	.	.	.	441
2.00 - 2.49	147	.	.	.	.	.	.	.	147	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	147	735	1617	1176	1618	2205	735	588	147	1029	0	0	

December 1988, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 ~ 0.49														
0.50 ~ 0.99														
1.00 ~ 1.49														
1.50 ~ 1.99														
2.00 ~ 2.49														
2.50 ~ 2.99														
3.00 ~ 3.49														
3.50 ~ 3.99														
4.00 ~ 4.49														
4.50 ~ 4.99														
5.00 ~ Greater														
Total														

Gage Inoperative

Table D3
Annual Joint Distribution of H_m versus T_p (All Years)

Annual 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	9	22	39	53	107	215	479	419	399	191	252	16	2201
0.50 - 0.99	5	82	241	427	471	426	694	731	901	189	300	32	4499
1.00 - 1.49	.	5	88	318	367	236	193	190	383	48	151	3	1982
1.50 - 1.99	.	.	4	69	183	112	59	65	153	45	82	5	777
2.00 - 2.49	.	.	.	2	38	42	22	38	84	41	50	2	319
2.50 - 2.99	.	.	.	.	5	15	23	24	42	20	36	2	167
3.00 - 3.49	.	.	.	.	.	.	4	6	16	6	13	.	45
3.50 - 3.99	.	.	.	.	.	.	.	.	3	1	3	.	7
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	14	109	372	869	1171	1046	1474	1473	1981	541	887	60	

Table D4
Monthly Joint Distribution of H_m versus T_p (All Years)

January 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	11	32	63	53	105	158	285	295	337	169	148	11	1667
0.50 - 0.99	.	169	253	390	443	295	485	379	885	158	295	11	3763
1.00 - 1.49	.	.	95	580	632	242	221	211	485	.	95	.	2561
1.50 - 1.99	.	.	.	105	274	253	84	126	190	42	42	.	1116
2.00 - 2.49	84	179	11	42	179	53	95	.	643
2.50 - 2.99	11	21	32	32	63	32	32	.	223
3.00 - 3.49	11	11	.	.	.	22
3.50 - 3.99	11	.	.	.	11
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	11	201	411	1128	1549	1148	1118	1096	2161	454	707	22	0

February 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	11	32	22	43	54	173	151	248	97	162	.	993	
0.50 - 0.99	11	65	140	410	356	356	647	669	1187	86	324	11	4262	
1.00 - 1.49	.	.	108	399	453	280	227	270	669	76	227	.	2709	
1.50 - 1.99	.	.	.	129	280	129	76	129	259	97	108	.	1207	
2.00 - 2.49	22	43	43	76	86	76	119	.	465	
2.50 - 2.99	11	22	32	86	22	108	.	281	
3.00 - 3.49	11	11	43	.	11	.	76	
3.50 - 3.99	11	.	11	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	11	76	280	960	1154	873	1199	1338	2578	454	1070	11	0	

March 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	10	.	.	70	50	80	250	200	250	110	130	.	1150	
0.50 - 0.99	10	50	220	509	490	500	739	629	919	130	320	.	4516	
1.00 - 1.49	.	10	130	300	330	330	170	250	639	40	370	.	2569	
1.50 - 1.99	.	.	.	80	160	80	80	80	230	70	170	10	960	
2.00 - 2.49	.	.	.	10	60	30	30	20	170	80	70	.	470	
2.50 - 2.99	.	.	.	.	.	10	30	.	70	50	50	.	210
3.00 - 3.49	.	.	.	.	.	.	20	10	40	20	40	.	130
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	20	60	350	969	1090	1030	1319	1189	2318	500	1150	10		

(Continued)

(Sheet 1 of 4)

Table D4 (Continued)
Monthly Joint Distribution of H_{mo} versus T_p (All Years)

Apr11 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	21	11	11	21	64	75	408	333	354	204	354	.	1856	
0.50 - 0.99	.	54	161	226	279	408	709	881	1386	289	559	21	4953	
1.00 - 1.49	.	.	75	161	269	279	236	236	430	43	183	.	1912	
1.50 - 1.99	.	.	11	32	118	54	64	129	236	21	107	.	772	
2.00 - 2.49	.	.	.	11	21	.	32	32	97	21	11	.	225	
2.50 - 2.99	11	21	32	21	64	43	11	.	203	
3.00 - 3.49	11	43	.	21	.	75	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	21	65	258	451	762	837	1481	1643	2610	601	1246	21		

May 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	10	29	29	39	197	236	659	521	413	98	236	.	2467	
0.50 - 0.99	.	138	226	403	590	511	1180	1091	787	79	226	10	5241	
1.00 - 1.49	.	.	29	147	167	216	393	216	285	20	108	.	1591	
1.50 - 1.99	.	.	.	59	69	20	69	49	88	20	88	.	462	
2.00 - 2.49	29	29	.	10	.	49	29	10	156	
2.50 - 2.99	29	29	20	.	78	
3.00 - 3.49	10	.	10	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	10	167	284	648	1052	1012	2301	1887	1602	295	717	20		

June 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period													Total
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	47	82	106	94	306	505	1105	623	470	129	176	24	3667
0.50 - 0.99	12	188	294	435	329	541	1163	1140	693	129	47	24	4995
1.00 - 1.49	.	.	47	141	200	153	153	129	212	.	12	12	1059
1.50 - 1.99	.	.	.	47	47	35	.	.	82	.	24	.	235
2.00 - 2.49	.	.	.	.	12	12	12	12	12	.	.	.	60
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	59	270	447	717	894	1246	2433	1904	1469	258	259	60	

(Continued)

(Sheet 2 of 4)

Table D4 (Continued)

Monthly Joint Distribution of H_{mo} versus T_p (All Years)

July 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	52	116	91	194	595	1307	1125	867	349	440	39	5175
0.50 - 0.99	.	103	336	336	582	543	763	724	362	259	103	91	4202
1.00 - 1.49	.	.	52	168	155	65	39	39	.	.	13	.	531
1.50 - 1.99	26	26	26	.	.	.	.	.	78
2.00 - 2.49	0
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	155	504	595	957	1229	2135	1888	1229	608	556	130	

August 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	24	24	59	213	521	817	884	627	355	225	12	3741	
0.50 - 0.99	24	95	225	663	663	604	852	769	521	201	189	36	4842	
1.00 - 1.49	.	.	59	260	213	154	130	47	71	.	.	.	834	
1.50 - 1.99	.	.	.	36	107	47	12	12	47	12	36	.	309	
2.00 - 2.49	12	12	.	.	36	.	59	.	119	
2.50 - 2.99	12	12	12	.	.	.	36	
3.00 - 3.49	12	12	.	.	.	24	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	24	119	308	1018	1208	1338	1823	1716	1326	568	509	48		

September 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period													Total
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	13	26	51	128	179	421	497	255	255	77	1902
0.50 - 0.99	.	26	255	344	497	383	383	765	1122	204	395	.	4374
1.00 - 1.49	.	.	38	306	472	319	242	306	548	140	204	.	2575
1.50 - 1.99	.	.	.	102	230	166	77	89	102	51	38	.	855
2.00 - 2.49	26	13	26	13	26	38	.	142
2.50 - 2.99	13	13	26	51	.	38	.	141
3.00 - 3.49	13	.	.	.	13
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	0	26	306	778	1250	1035	907	1633	2346	676	968	77	

(Continued)

(Sheet 3 of 4)

Table D4 (Concluded)

Monthly Joint Distribution of H_{mo} versus T_p (All Years)

October 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	10	.	19	48	10	124	258	230	306	96	258	19	1378	
0.50 - 0.99	.	57	172	287	373	297	498	651	1148	191	297	48	4019	
1.00 - 1.49	.	10	144	440	373	191	86	249	517	77	230	19	2336	
1.50 - 1.99	.	.	29	105	287	86	48	67	268	77	163	29	1159	
2.00 - 2.49	96	77	67	134	153	67	48	10	652	
2.50 - 2.99	19	57	67	57	29	19	77	19	344	
3.00 - 3.49	10	.	.	38	38	.	86	
3.50 - 3.99	19	10	.	.	29	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	10	67	364	880	1158	832	1034	1388	2440	575	1111	144		

November 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	10	52	84	42	136	262	157	210	199	346	.	1498	
0.50 - 0.99	.	21	367	461	618	451	556	493	681	314	388	31	4381	
1.00 - 1.49	.	42	147	419	587	325	241	157	273	115	126	10	2442	
1.50 - 1.99	.	.	.	52	273	231	136	42	126	105	73	21	1059	
2.00 - 2.49	52	31	31	10	84	63	73	.	344	
2.50 - 2.99	10	31	42	21	31	42	.	177	
3.00 - 3.49	10	31	10	21	.	72	
3.50 - 3.99	21	.	21	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	73	566	1016	1572	1184	1257	911	1426	837	1090	62		

December 1980-1987, Gage 625 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	23	23	35	47	82	246	317	352	317	328	23	1793	
0.50 - 0.99	.	23	270	692	457	258	328	610	1008	281	422	117	4466	
1.00 - 1.49	.	.	106	457	528	246	141	129	363	59	188	.	2217	
1.50 - 1.99	.	.	.	59	293	211	23	35	141	23	94	.	879	
2.00 - 2.49	47	47	12	82	141	35	47	.	411	
2.50 - 2.99	12	23	23	59	70	.	35	.	222	
3.00 - 3.49	12	.	.	.	.	12	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	0	46	399	1243	1384	867	773	1244	2075	715	1114	140		

(Sheet 4 of 4)

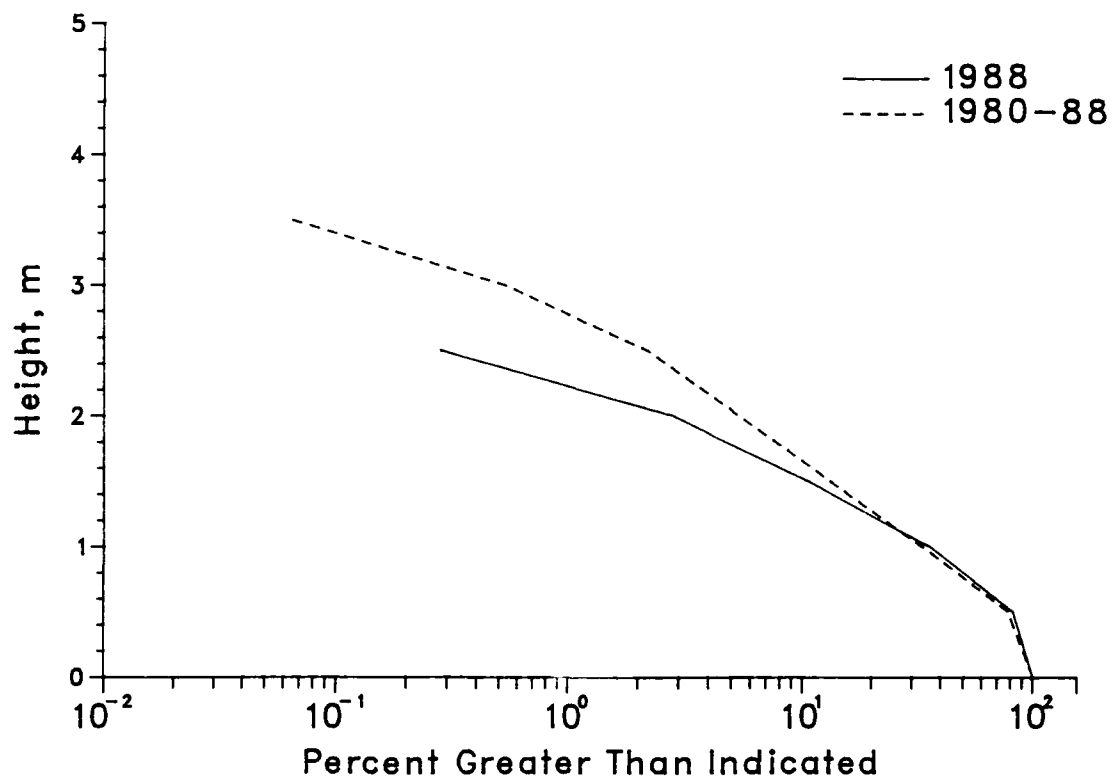


Figure D2. Annual cumulative wave height distributions
for Gage 625

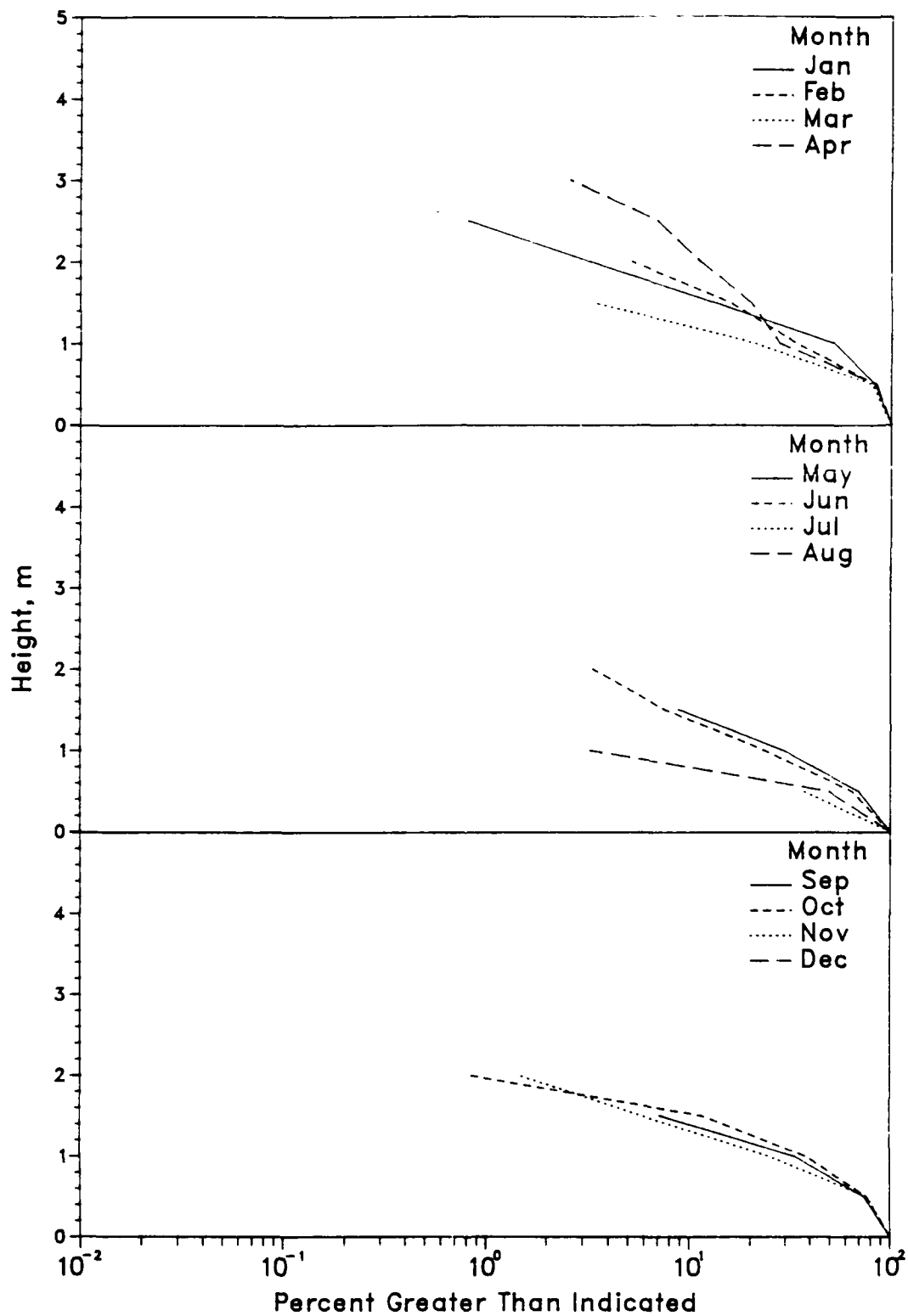


Figure D3. 1988 monthly wave height distributions for Gage 625

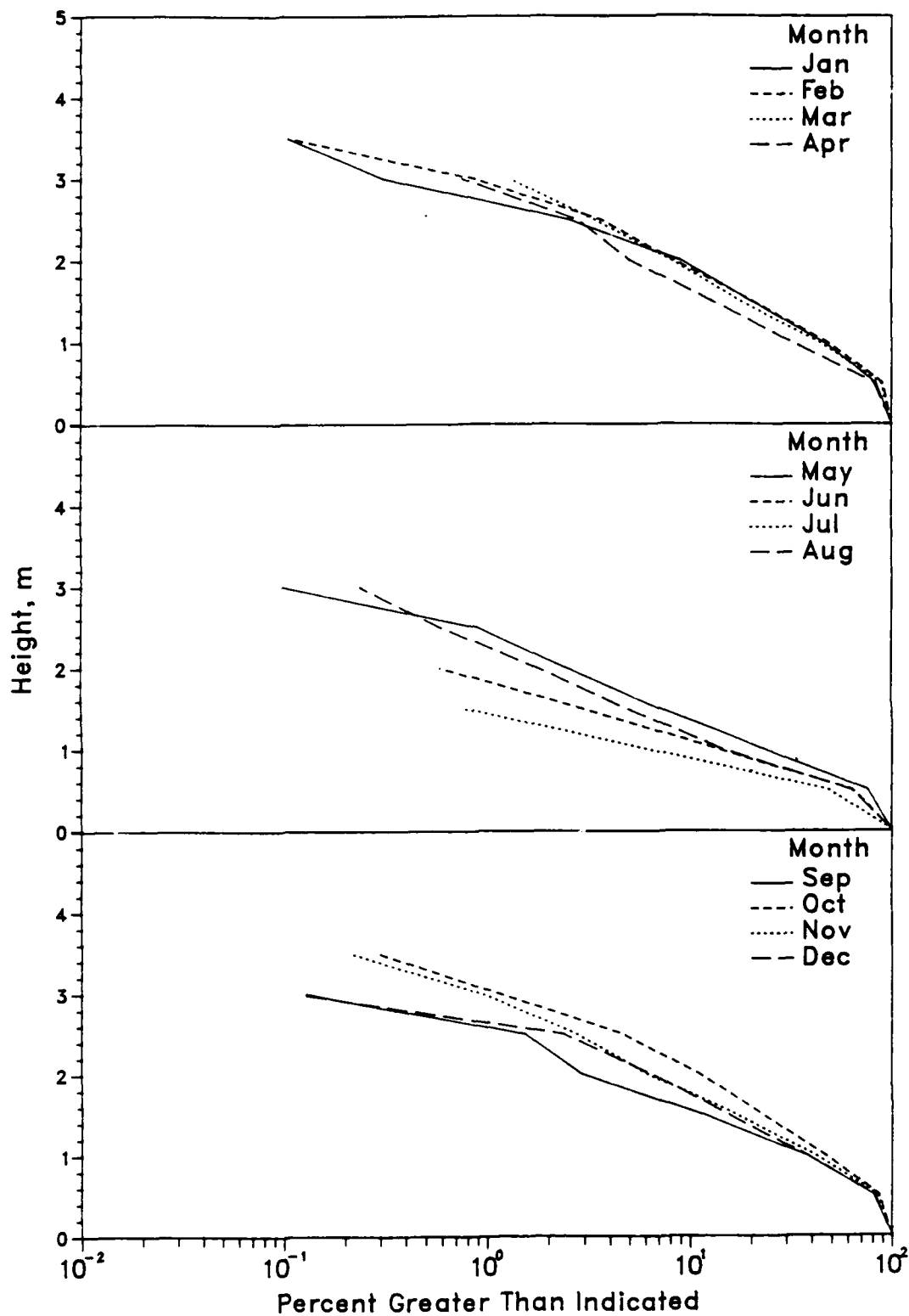


Figure D4. 1980-1988 monthly wave height distributions for Gage 625

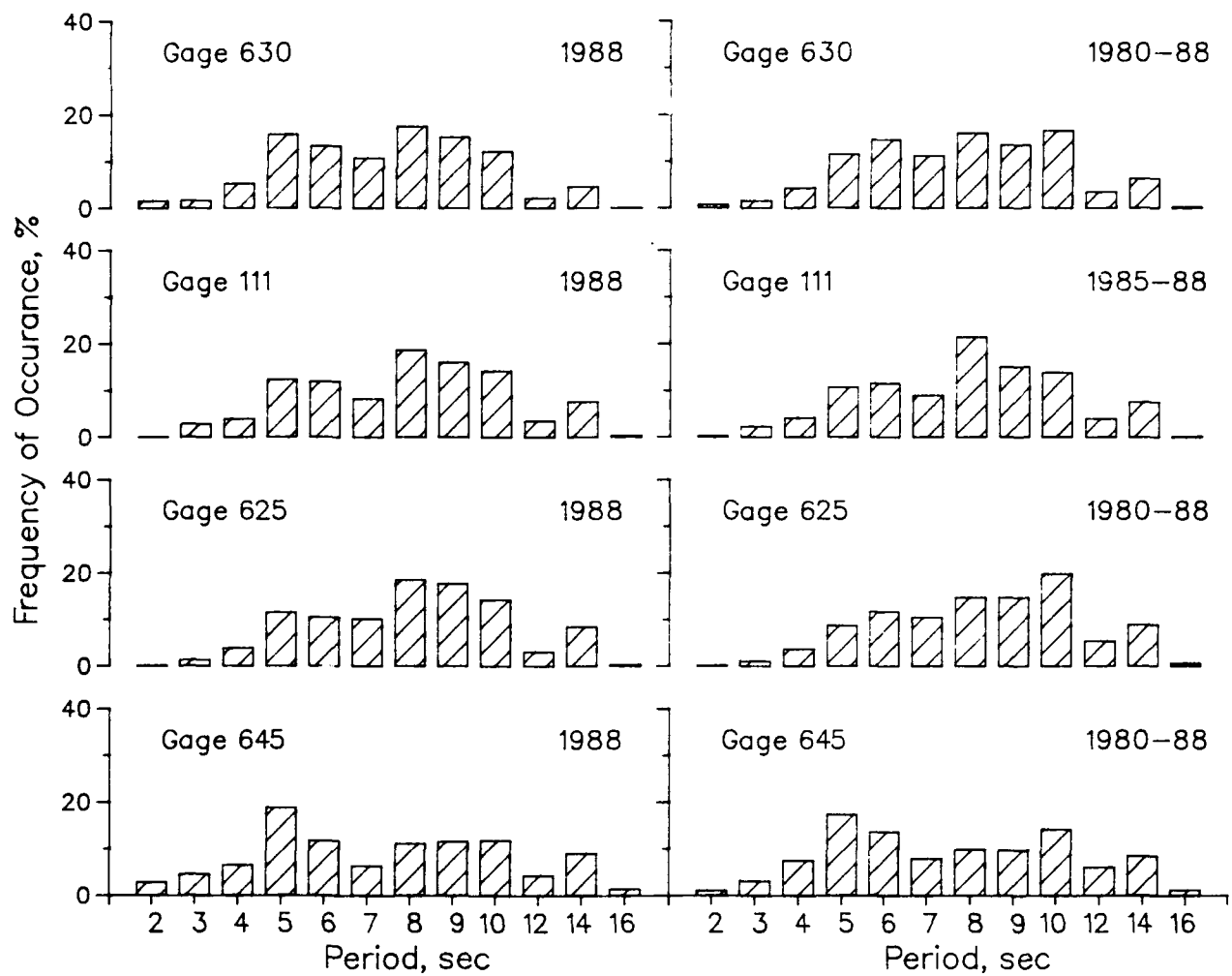


Figure D5. Annual wave period distributions for all gages

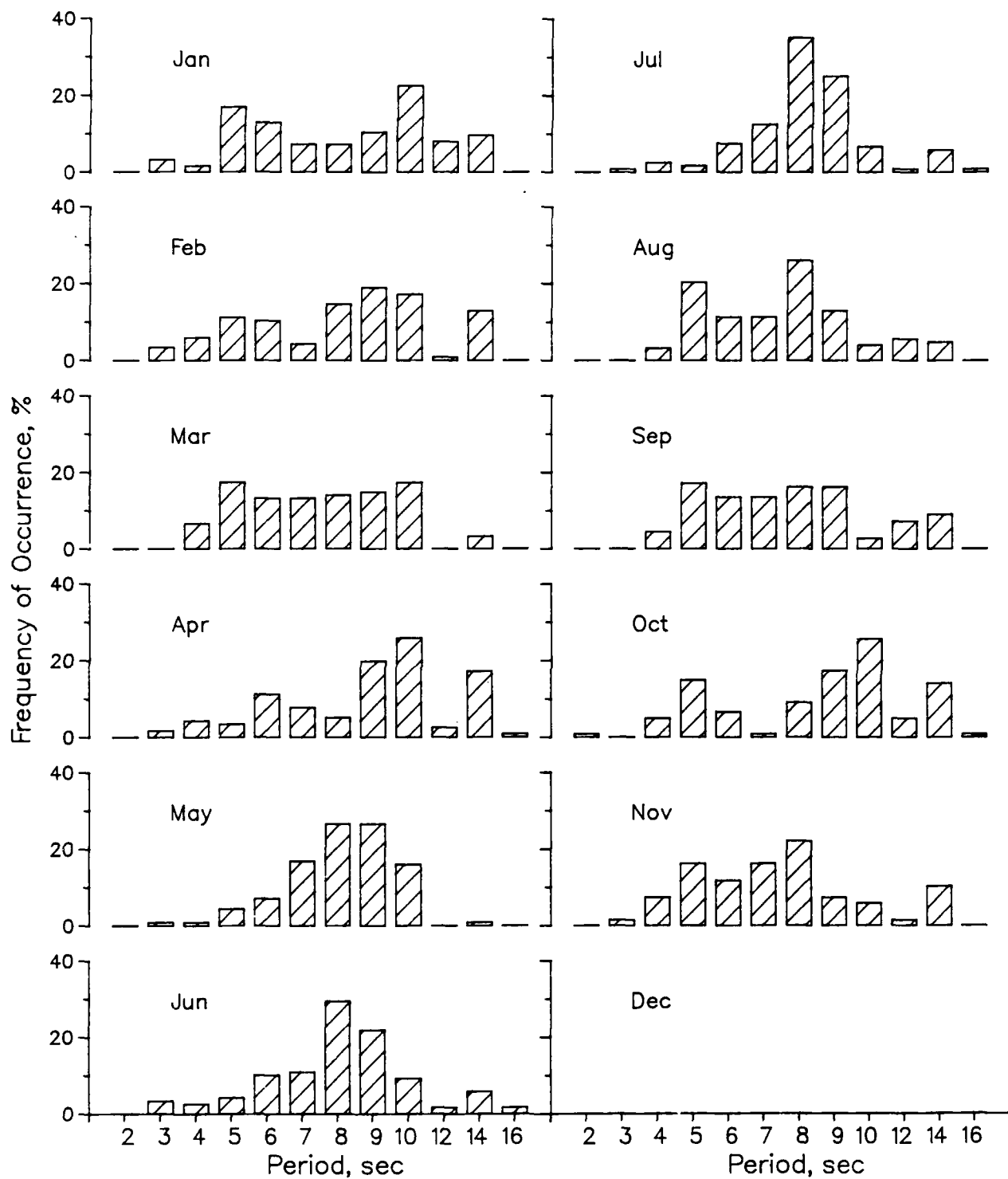


Figure D6. 1988 monthly wave period distributions for Gage 625

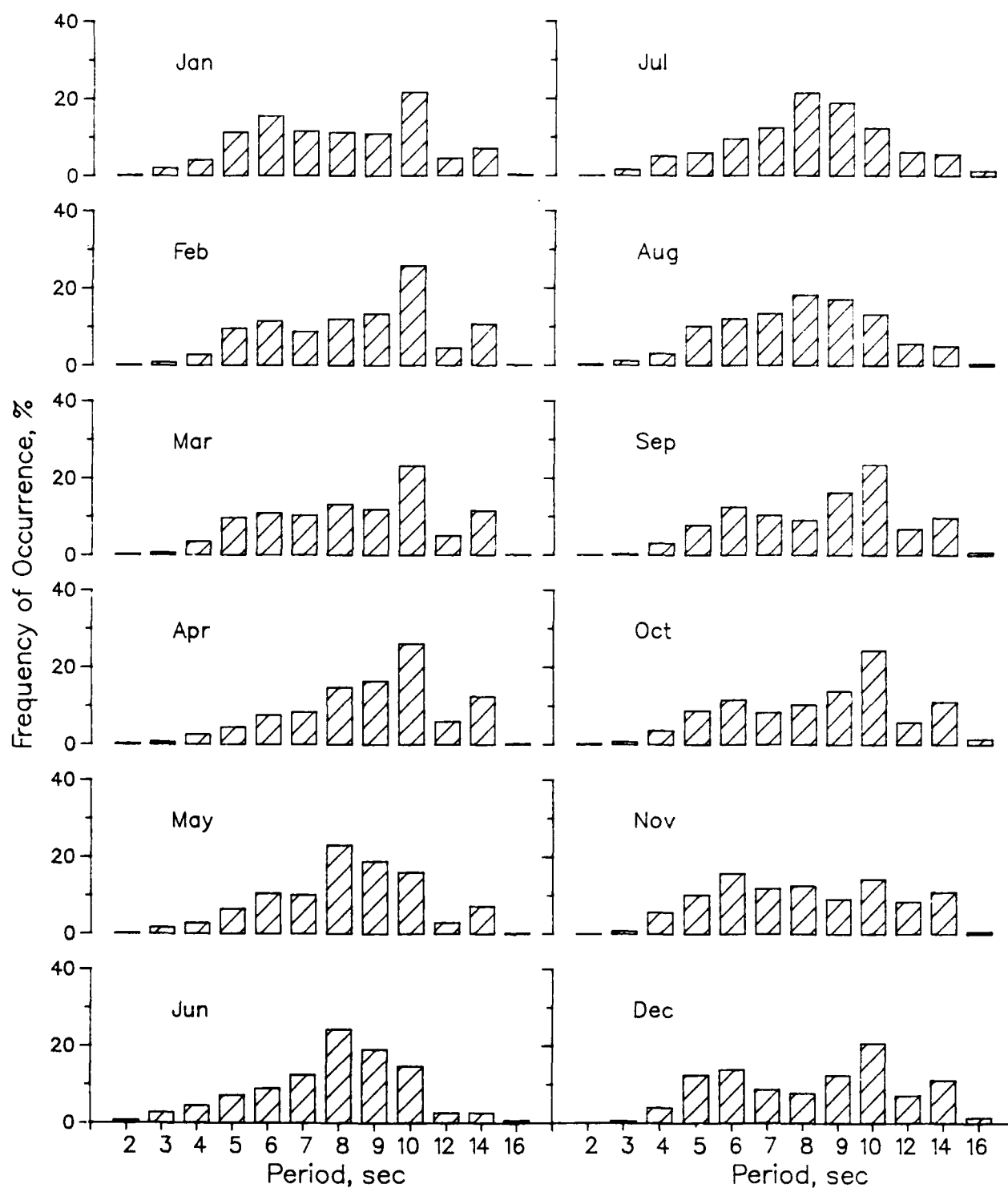


Figure D7. 1980-1988 monthly wave period distributions for Gage 625

Table D5
1988 Persistence of H_{mo} for Gage 625

Height (m)	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	26	23		21	18	16	13		11	10	9	6			5				4
1.0	36	25	20	11	8	4		3							1				
1.5	28	11	7	2															
2.0	9	4	1																
2.5	3		1																
3.0	1																		

Table D6
1980 through 1988 Persistence of H_{mo} for Gage 625

Height (m)	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	28	25	21	19	16	14	12	11	10	9		8	7		6	5			4
1.0	45	32	22	15	10	7	5	4	3			1							
1.5	30	17	9	5	3	2	1												
2.0	15	8	4	2	1														
2.5	8	4	1																
3.0	2																		
3.5																			
4.0																			

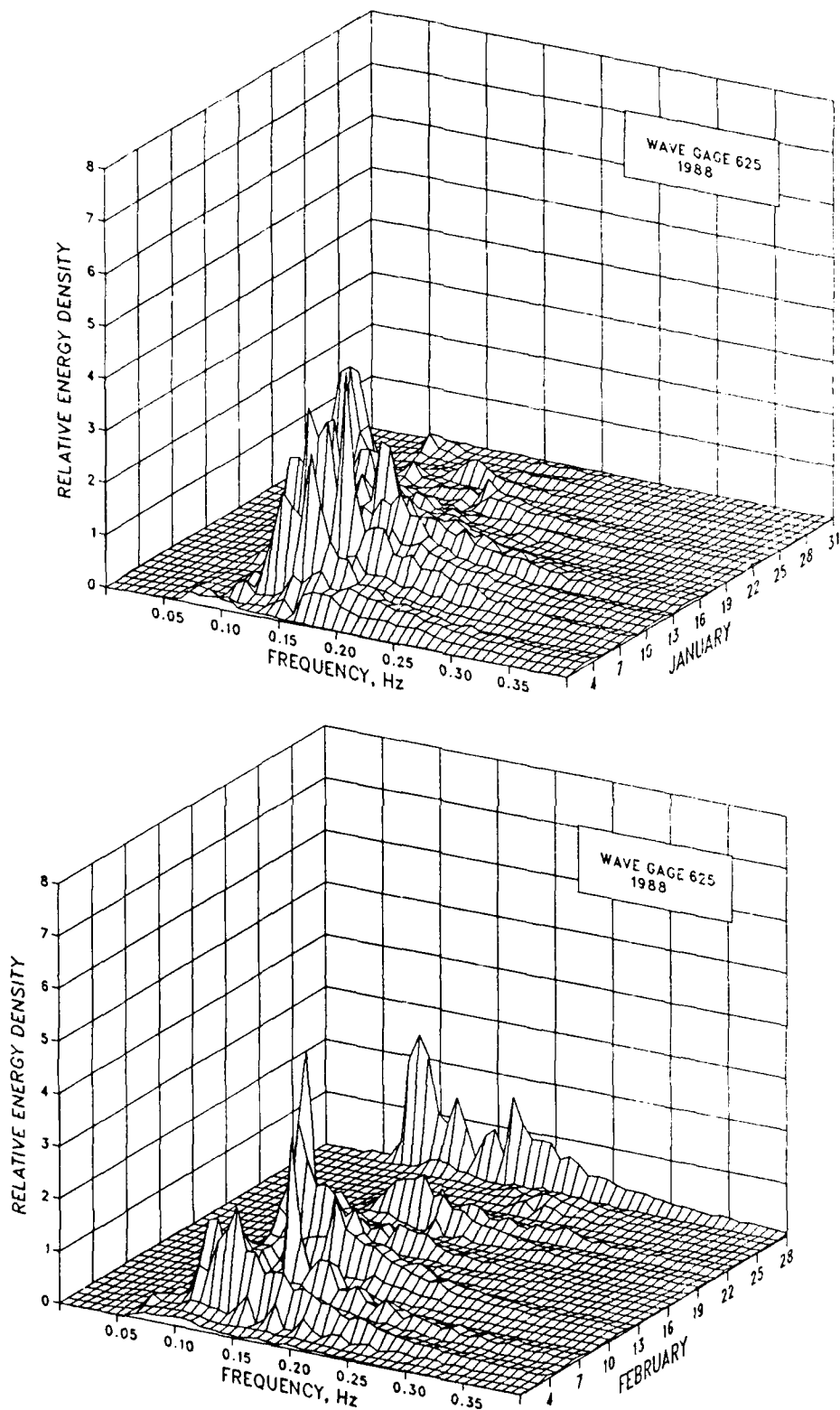


Figure D8. 1988 monthly spectra for Gage 625
(Sheet 1 of 6)

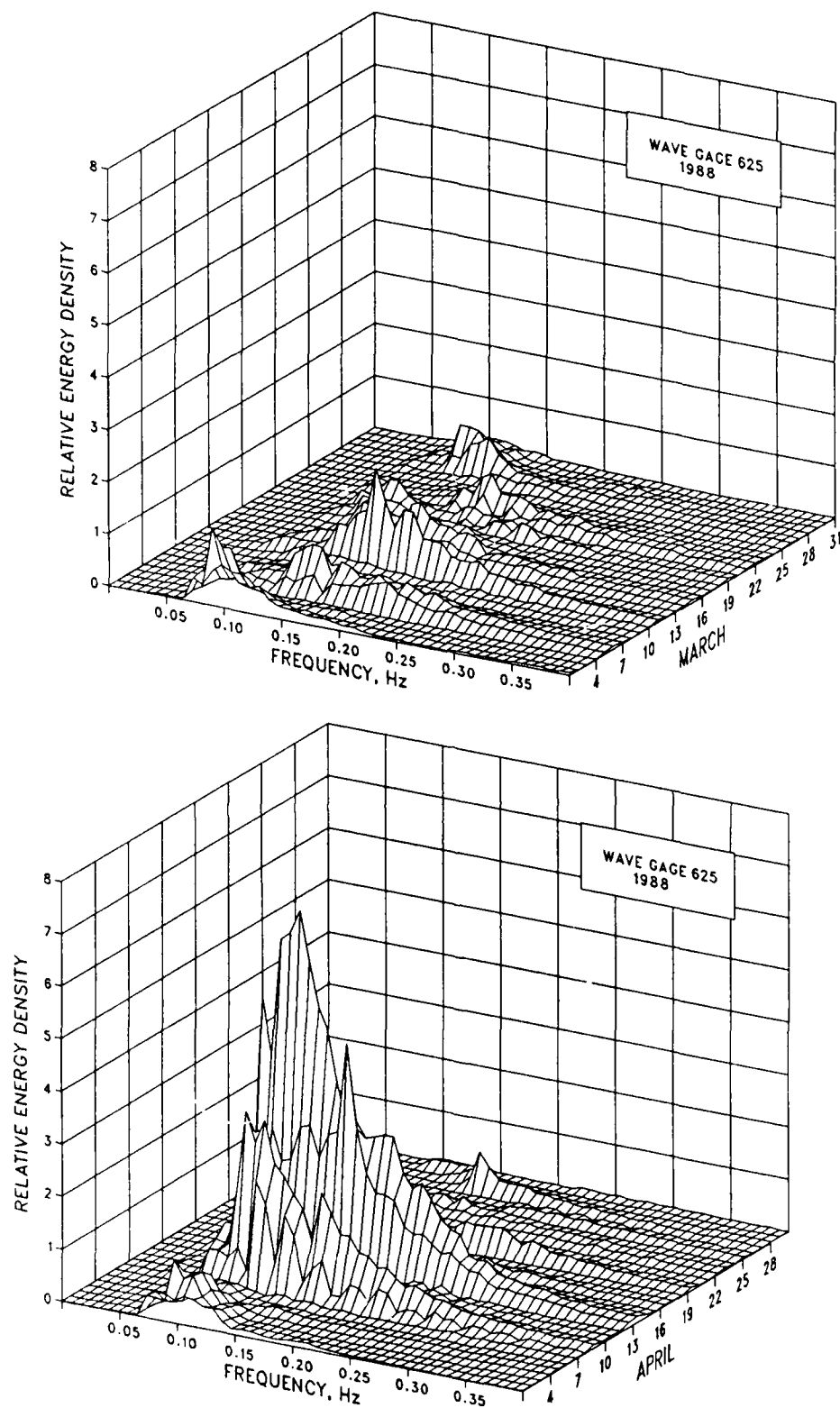


Figure D8. (Sheet 2 of 6)

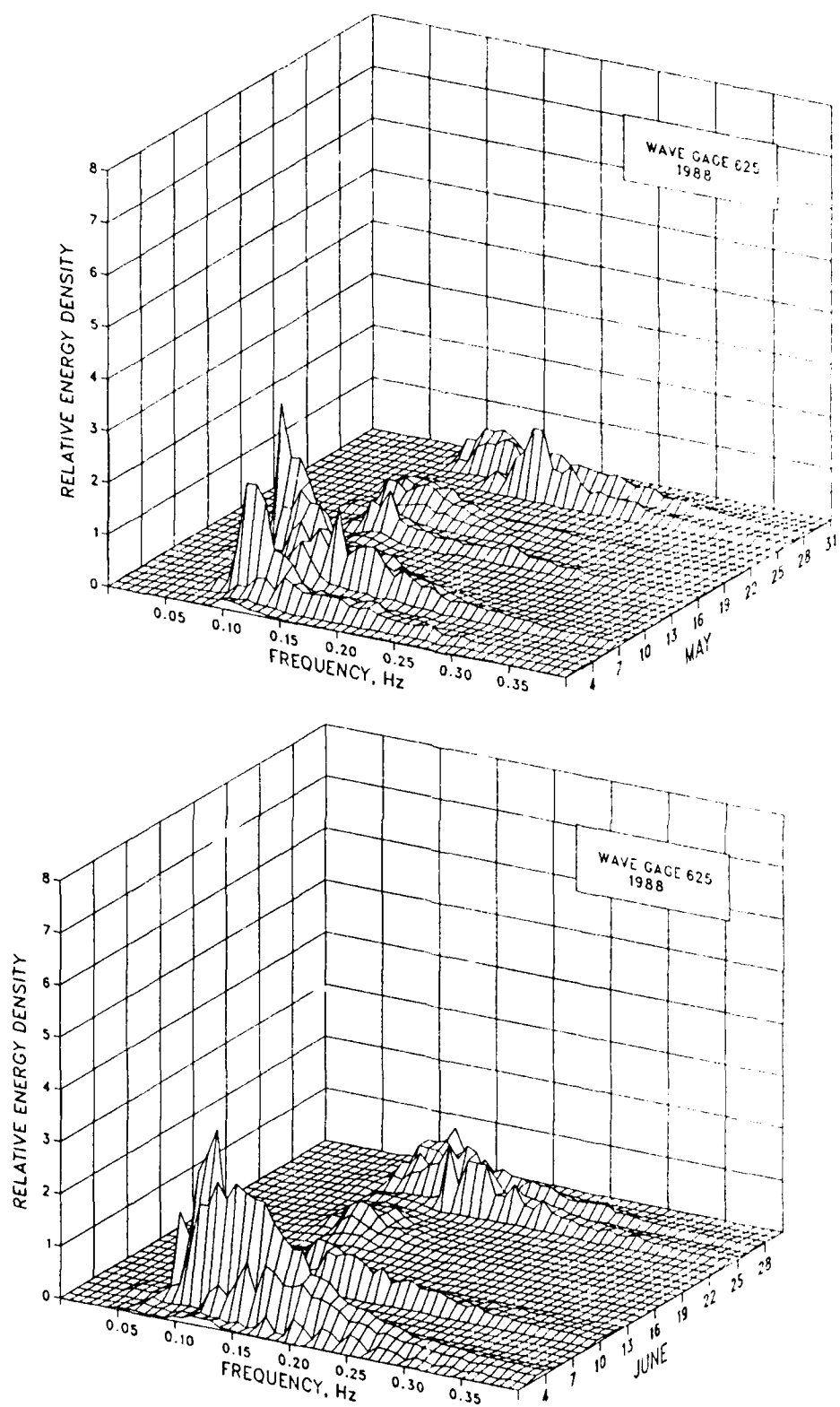


Figure D8. (Sheet 3 of 6)

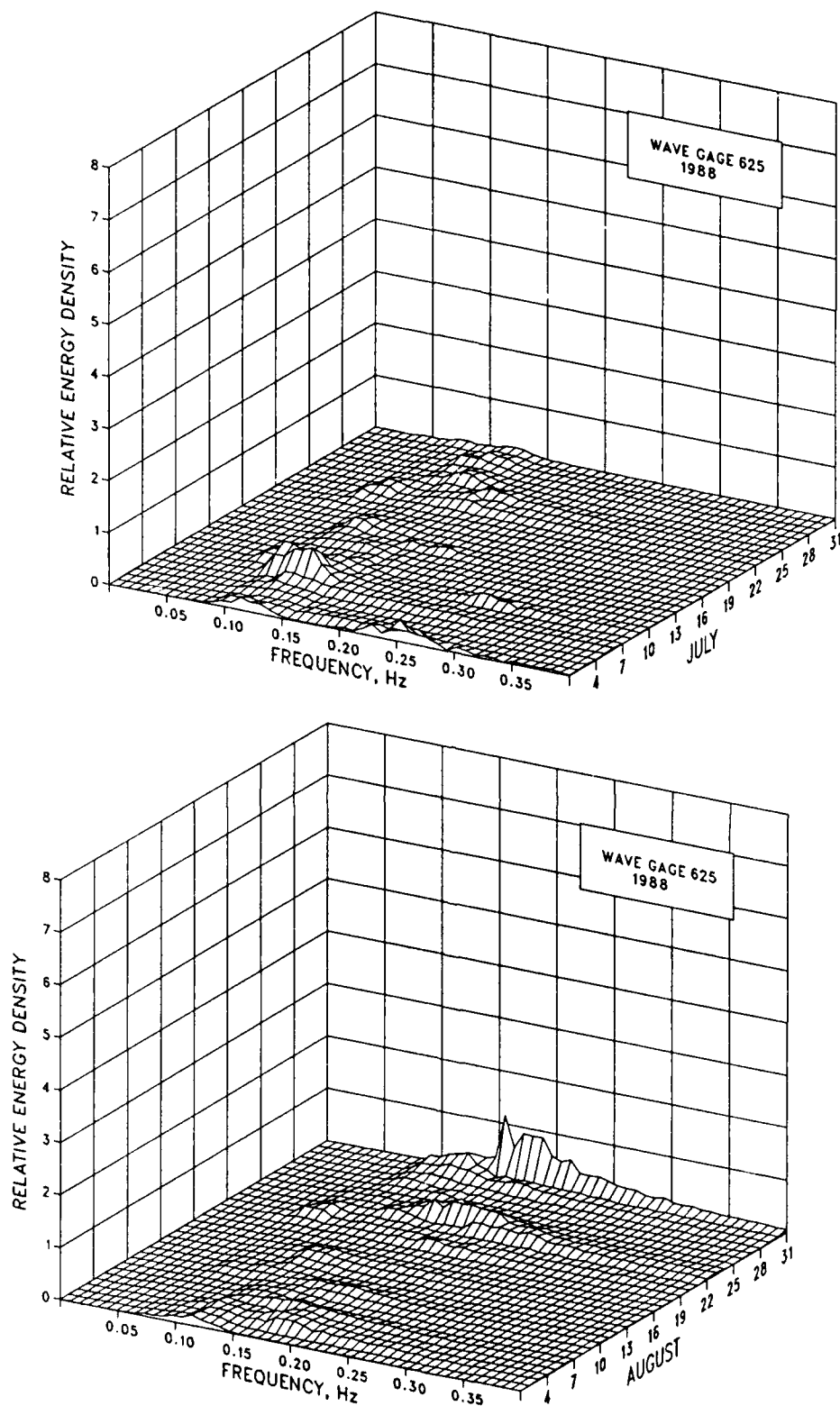


Figure D8. (Sheet 4 of 6)

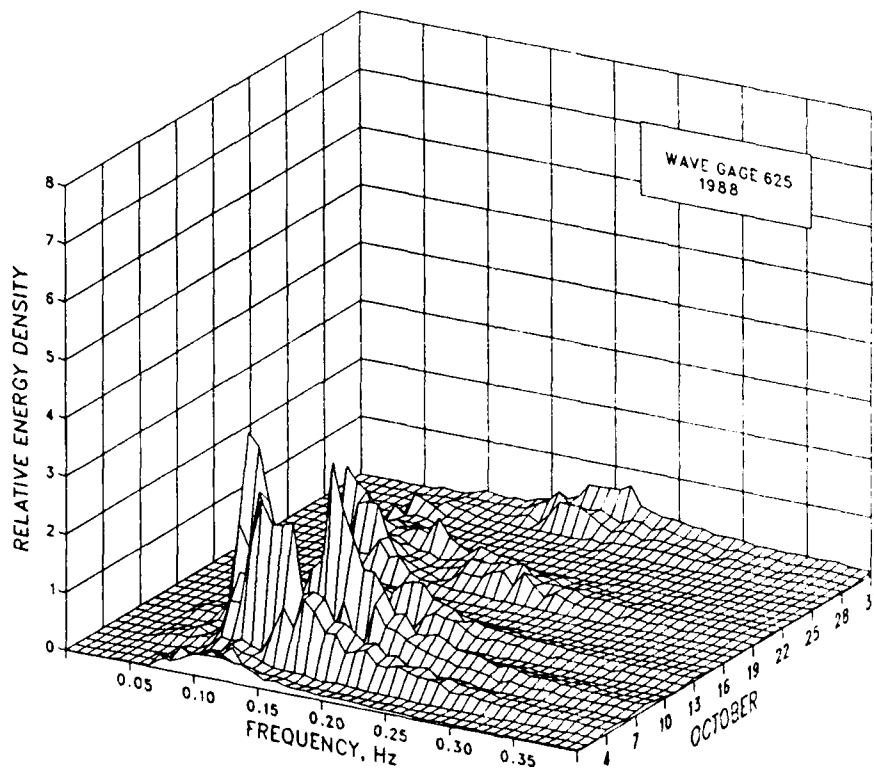
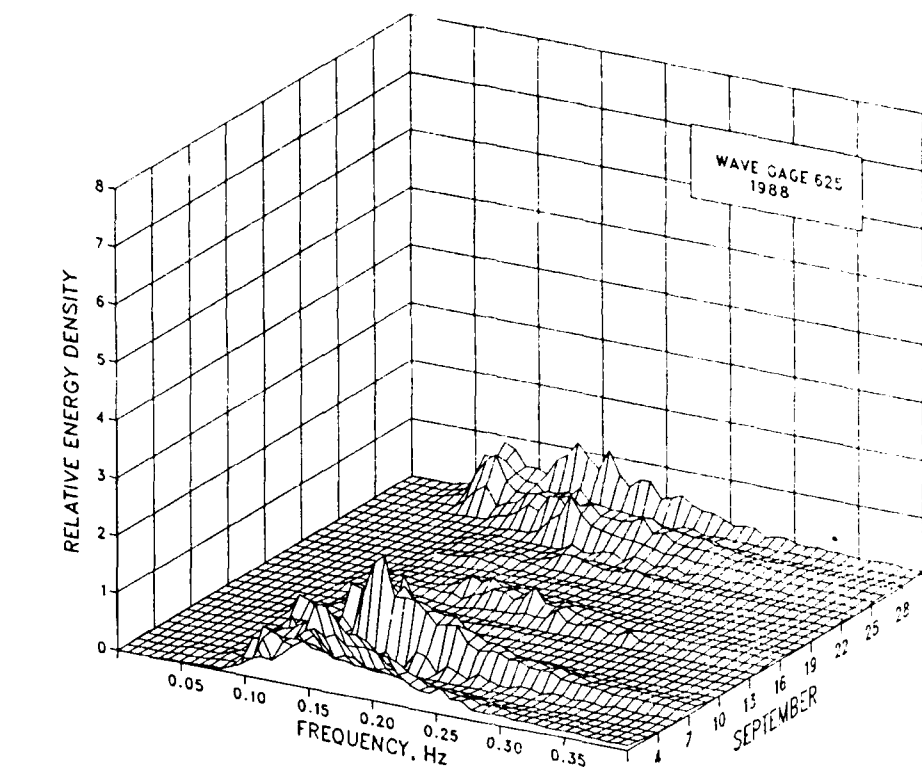


Figure D8. (Sheet 5 of 6)

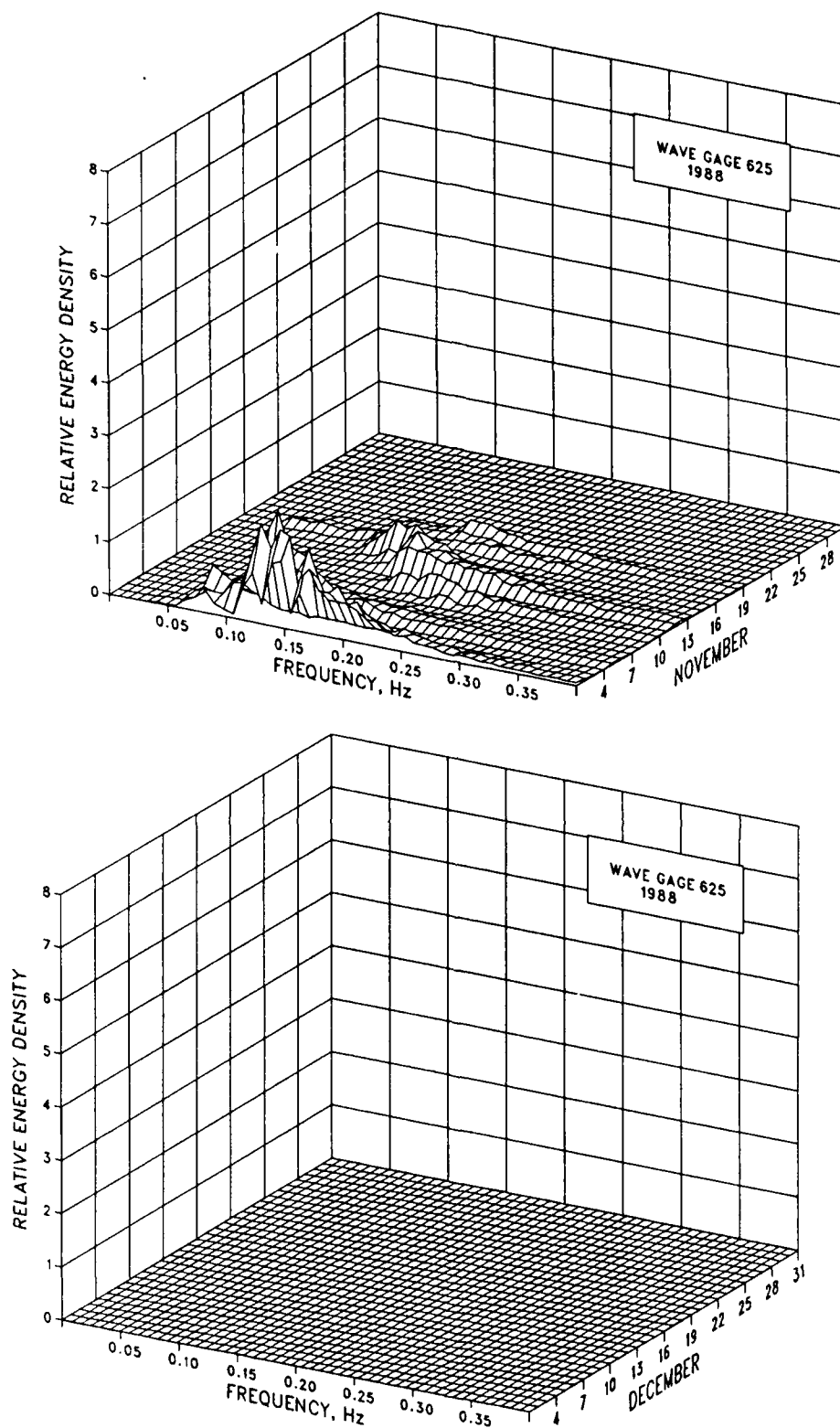


Figure D8. (Sheet 6 of 6)

Table D7
Wave Statistics for Gage 625

Month	1988							1980-1988						
	Height				Period			Height				Period		
	Mean	Std.	Extreme	Date	Mean	Std.	Number	Mean	Std.	Extreme	Date	Mean	Std.	Number
		Dev.				Dev.			Dev.				Dev.	
m	m	m		sec	sec	Obs.	m	m	m		sec	sec	Obs.	
Jan	1.1	0.5	2.7	8	9.0	3.1	124	1.1	0.6	3.5	1988	8.5	2.7	949
Feb	1.0	0.5	2.5	28	8.8	2.8	116	1.1	0.6	3.8	1983	9.0	2.7	927
Mar	0.8	0.4	1.9	11	8.0	2.2	121	1.1	0.6	3.4	1983	9.0	2.7	1001
Apr	1.1	0.7	3.4	13	9.8	3.1	116	0.9	0.6	3.4	1988	9.5	2.6	931
May	0.9	0.5	1.8	9	8.7	1.7	113	0.8	0.5	3.0	1986	8.6	2.4	1017
Jun	0.8	0.5	2.3	4	8.6	2.2	119	0.7	0.4	2.3	1983	8.2	2.4	851
Jul	0.5	0.2	1.0	31	8.9	2.4	120	0.6	0.3	1.8	1985	8.7	2.8	773
Aug	0.6	0.3	1.3	31	8.2	2.5	123	0.7	0.4	3.1	1981	8.5	2.6	845
Sep	0.9	0.5	1.9	8	8.4	2.7	111	0.9	0.5	3.0	1983	9.1	2.8	784
Oct	0.9	0.5	2.1	4	9.5	3.0	121	1.1	0.7	3.5	1980	9.2	2.9	1045
Nov	0.9	0.4	2.1	1	7.9	2.4	68	1.0	0.6	3.5	1981	8.7	3.0	954
Dec							0	1.0	0.6	3.1	1986	9.0	3.1	853
Annual	0.9	0.5	3.4	Apr	8.7	2.7	1252	0.9	0.6	3.8	Feb 1983	8.8	2.8	10930

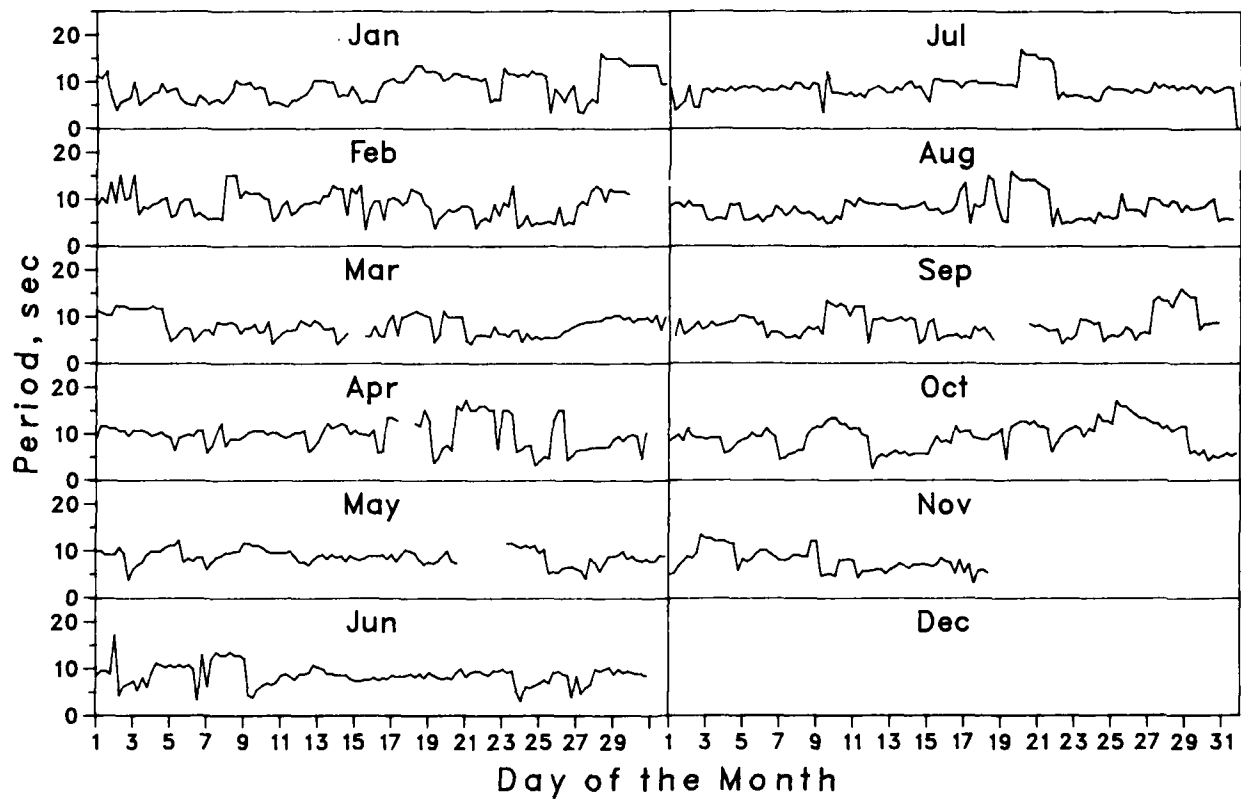
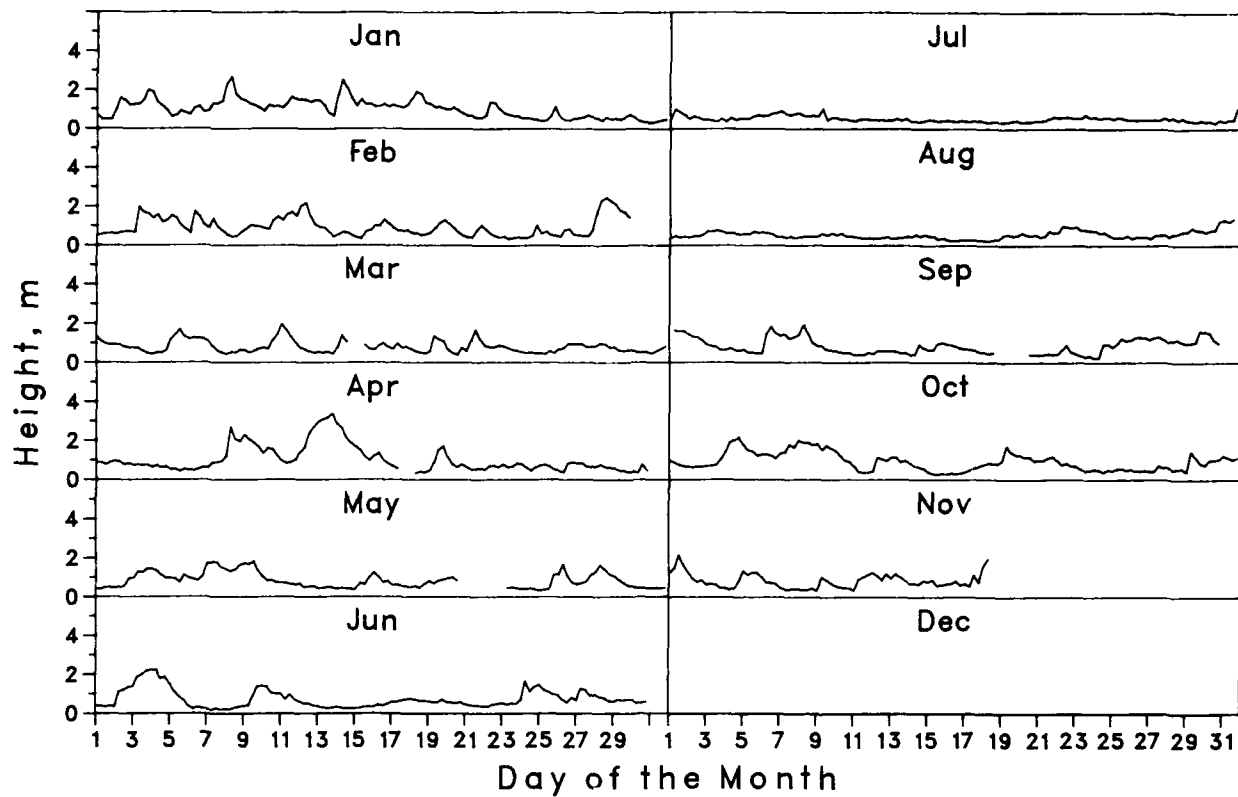


Figure D9. Time-histories of wave height and period
for Gage 625

APPENDIX E: WAVE DATA FOR GAGE 645

1. Wave data summaries for Gage 645 are presented for 1988 and for 1980 through 1988 in the following forms:

Daily H_{m0} and T_p

2. Figure E1 displays the individual wave height and peak spectral wave period values along with the monthly mean values.

Joint Distributions of H_{m0} and T_p

3. Annual and monthly joint distributions tables are presented in Tables E1 and E2, and data for 1980 through 1988 are in Tables E3 and E4. Each table gives the frequency (in parts per 10,000) for which the wave height and peak period were within the specified intervals; these values can be converted to percent by dividing by 100. Marginal totals are also included. The row total gives the total number of observations out of 10,000 which fell within each specified peak period interval. The column total gives the number of observations out of 10,000 which fell within each specified wave height interval.

Cumulative Distributions of Wave Height

4. Annual and monthly wave height distributions for 1988 are plotted in cumulative form in Figures E2 and E3. Data for 1980 through 1988 are in Figure E4.

Peak Spectral Wave Period Distributions

5. Annual and monthly peak wave period, T_p , distribution histograms for 1988 are presented in Figures E5 and E6. Data for 1980 through 1988 are in Figure E7.

Persistence of Wave Heights

6. Table E5 shows the number of times in 1988 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1980 through 1988 are given in Table E6. An example is shown below:

Height m	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	18	15		14	13	12		11	10	9				8		7			
1.0	50	34	24	21	18	14	12	8	7	3			2						
1.5	41	19	8	6	2	1													
2.0	22	9	5	1															
2.5	10	5	2																
3.0	6	1																	
3.5		1																	
4.0	1																		

This example indicates that wave heights equaled or exceeded 1.0 m 50 times for at least 1 day; 34 times for at least 2 days; 24 times for at least 3 days, etc. Therefore, on 16 occasions the height equaled or exceeded 1.0 m for 1 day exactly ($50 - 34 = 16$); on 10 occasions for 2 days; on 3 occasions for 3 days, etc. Note that the height exceeded 1 m 50 times for 1 day or longer, while heights exceeded 0.5 m only 18 times for this same duration. This change in durations occurred because the longer durations of lower waves may be interspersed with shorter, but more frequent, intervals of higher waves. For example, one of the times that the wave heights exceeded 0.5 m for 16 days may have represented 3 times the height exceeded 1 m for shorter durations.

Spectra

7. Monthly spectra for the offshore Waverider buoy (Gage 645) are presented in Figure E8. The plots show "relative" energy density as a function of wave frequency. These figures summarize the large number of spectra for each month. The figures emphasize the higher energy density associated with storms as well as the general shifts in energy density to different frequencies. As used here, "relative" indicates the spectra have been smoothed by the three-dimension surface drawing routine. Consequently, extremely high- and low-energy density values are modified to produce a smooth

surface. The figures are not intended for quantitative measurements; however, they do provide the energy density as a function of frequency relative to the other spectra for the month.

8. Monthly and annual wave statistics for Gage 645 for 1988 and for 1980 through 1988 are presented in Table E7.

9. Figure E9 plots monthly time histories of wave height and period.

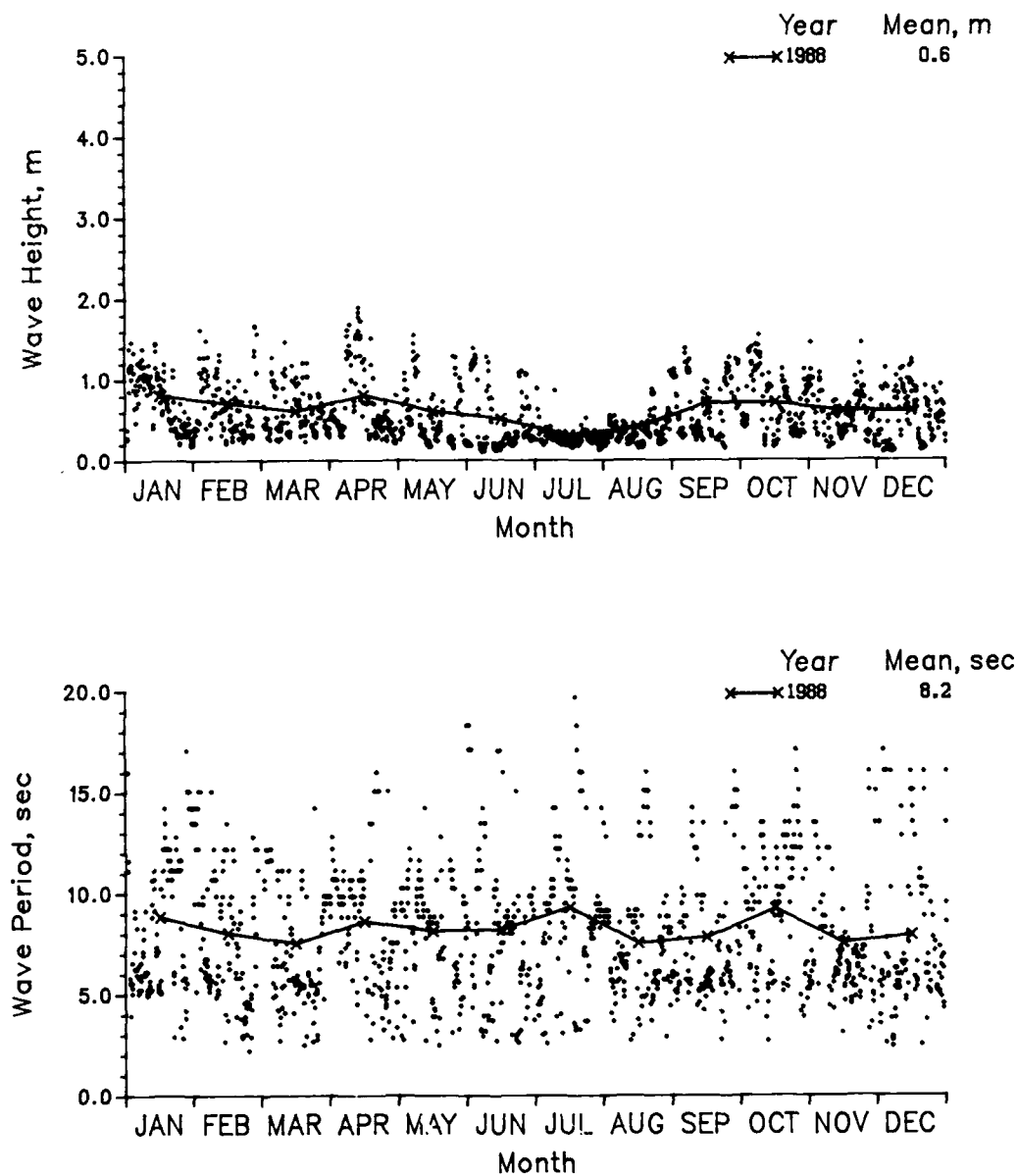


Figure E1. 1988 daily wave height and period values with monthly means for Gage 645

Table E1

Annual Joint Distribution of H_{m0} versus T_p

Annual 1988, Gage 645 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	267	288	253	442	330	316	856	835	779	330	604	126	5426
0.50 - 0.99	14	168	358	912	505	140	140	225	302	56	239	7	3066
1.00 - 1.49	.	.	42	526	302	168	98	70	77	42	49	.	1374
1.50 - 1.99	.	.	.	.	35	14	21	28	21	.	14	.	133
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	281	456	653	1880	1172	638	1115	1158	1179	428	906	133	

Table E2
Monthly Joint Distribution of H_{mo} versus T_p

January 1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	81	81	81	242	161	.	81	242	1210	726	403	81	3389	
0.50 - 0.99	81	161	.	806	323	.	242	323	806	81	645	.	3468	
1.00 - 1.49	.	.	81	1613	565	484	161	81	.	161	.	.	3146	
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	162	242	162	2661	1049	484	484	646	2016	968	1048	81		

February 1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	431	345	431	259	.	172	431	431	431	259	1034	.	4224	
0.50 - 0.99	.	259	517	776	517	172	.	862	431	.	172	.	3706	
1.00 - 1.49	.	.	.	517	431	172	259	172	.	.	172	.	1723	
1.50 - 1.99	172	.	.	.	.	.	172	.	344	
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	431	604	948	1552	1120	516	690	1465	862	259	1550	0		

March 1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	413	165	331	496	248	.	248	1405	1157	83	413	.	4959	
0.50 - 0.99	83	83	496	1488	331	331	413	248	331	.	83	.	3887	
1.00 - 1.49	.	.	83	579	331	165	.	.	.	.	.	.	1158
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	496	248	910	2563	910	496	661	1653	1488	83	496	0		

(Continued)

(Sheet 1 of 4)

Table E2 (Continued)
Monthly Joint Distribution of H_{mo} versus T_p

April 1988, Gage 645 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	172	86	172	345	690	603	172	948	690	172	603	.	4653
0.50 - 0.99	.	431	431	431	86	86	86	431	690	.	345	.	3017
1.00 - 1.49	.	.	.	431	86	86	86	86	431	.	.	.	1206
1.50 - 1.99	172	86	259	345	259	.	.	.	1121
2.00 - 2.49	0
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	172	517	603	1207	1034	861	603	1810	2070	172	948	0	

May 1988, Gage 645 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	442	354	88	88	265	265	1593	1062	1062	88	177	177	5661
0.50 - 0.99	.	354	619	265	354	177	265	177	619	.	.	.	2830
1.00 - 1.49	.	.	88	265	177	177	177	265	265	.	.	.	1414
1.50 - 1.99	88	.	.	.	.	.	.	.	88
2.00 - 2.49	0
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	442	708	795	618	884	619	2035	1504	1946	88	177	177	

June 1988, Gage 645 Percent Occurrence(X100) of Height and Period													Total
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	588	840	252	.	.	336	2017	1261	504	336	252	588	6974
0.50 - 0.99	.	252	.	168	588	84	.	.	168	.	84	.	1344
1.00 - 1.49	.	.	168	588	588	.	168	.	168	.	.	.	1680
1.50 - 1.99	0
2.00 - 2.49	0
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	588	1092	420	756	1176	420	2185	1261	840	336	336	588	

(Continued)

(Sheet 2 of 4)

Table E2 (Continued)
Monthly Joint Distribution of H_{mo} versus T_p

July 1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	161	645	323	161	484	806	1694	1855	1613	403	968	403	9516	
0.50 - 0.99	.	161	81	161	81	.	.	.	.	.	.	.	484
1.00 - 1.49	0	
1.50 - 1.99	0	
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	161	806	404	322	565	806	1694	1855	1613	403	968	403		

August 1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	244	244	569	1382	1463	732	1951	650	.	407	732	.	8374	
0.50 - 0.99	.	81	407	407	244	.	163	.	.	.	.	.	1302
1.00 - 1.49	.	.	.	244	81	.	.	.	.	.	.	.	325
1.50 - 1.99	0	
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	244	325	976	2033	1788	732	2114	650	0	407	732	0		

September 1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	90	90	180	811	90	360	721	901	180	360	541	.	4324	
0.50 - 0.99	.	.	360	1622	450	90	.	.	.	270	450	.	3242	
1.00 - 1.49	.	.	.	1171	721	360	90	.	.	90	.	.	2432	
1.50 - 1.99	0	
2.00 - 2.49	0	
2.50 - 2.99	0	
3.00 - 3.49	0	
3.50 - 3.99	0	
4.00 - 4.49	0	
4.50 - 4.99	0	
5.00 - Greater	0	
Total	90	90	540	3604	1261	810	811	901	180	720	991	0		

(Continued)

(Sheet 3 of 4)

Table E2 (Concluded)
Monthly Joint Distribution of H_{mo} versus T_p

October 1988, Gage 645 Percent Occurrence(X100) of Height and Period															Total
Height(m)	Period(sec)														
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer			
0.00 - 0.49	83	83	83	165	.	.	331	579	1322	496	744	83	3969		
0.50 - 0.99	.	83	413	1157	331	83	165	248	579	83	661	83	3886		
1.00 - 1.49	.	.	83	661	248	165	165	248	83	165	248	.	2066		
1.50 - 1.99	83	.	.	.	.	.	.	83		
2.00 - 2.49	0		
2.50 - 2.99	0		
3.00 - 3.49	0		
3.50 - 3.99	0		
4.00 - 4.49	0		
4.50 - 4.99	0		
5.00 - Greater	0		
Total	83	166	579	1983	579	331	661	1075	1984	744	1653	166			

November 1988, Gage 645 Percent Occurrence(X100) of Height and Period															Total
Height(m)	Period(sec)														
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer			
0.00 - 0.49	.	174	348	609	435	348	609	348	348	348	696	.	4263		
0.50 - 0.99	.	87	609	1565	1304	435	261	435	.	174	.	.	4870		
1.00 - 1.49	.	.	.	174	261	348	87	.	.	.	.	.	870
1.50 - 1.99	0		
2.00 - 2.49	0		
2.50 - 2.99	0		
3.00 - 3.49	0		
3.50 - 3.99	0		
4.00 - 4.49	0		
4.50 - 4.99	0		
5.00 - Greater	0		
Total	0	261	957	2348	2000	1131	957	783	348	522	696	0			

December 1988, Gage 645 Percent Occurrence(X100) of Height and Period															Total
Height(m)	Period(sec)														
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer			
0.00 - 0.49	492	328	164	738	82	164	410	328	738	246	656	164	4510		
0.50 - 0.99	.	82	410	2131	1475	246	82	.	.	82	410	.	4918		
1.00 - 1.49	.	.	.	82	164	82	.	.	.	82	164	.	574		
1.50 - 1.99	0		
2.00 - 2.49	0		
2.50 - 2.99	0		
3.00 - 3.49	0		
3.50 - 3.99	0		
4.00 - 4.49	0		
4.50 - 4.99	0		
5.00 - Greater	0		
Total	492	410	574	2951	1721	492	492	328	738	410	1230	164			

Table E3
Annual Joint Distribution of H_m versus T_p (All Years)

Annual 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	76	128	229	416	283	275	537	547	653	344	379	70	3937
0.50 - 0.99	26	180	468	971	685	330	324	300	524	136	260	30	4234
1.00 - 1.49	.	1	52	341	361	162	104	88	177	91	149	8	1534
1.50 - 1.99	.	.	.	8	34	26	18	35	64	31	55	4	275
2.00 - 2.49	.	.	.	.	.	2	1	2	3	6	5	.	19
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	102	309	749	1736	1363	795	984	972	1421	608	848	112	

Table E4
Monthly Joint Distribution of H_{mo} versus T_p (All Years)

January 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	87	109	262	371	240	153	284	414	523	305	284	65	3097
0.50 - 0.99	33	174	382	1036	742	240	262	229	654	65	305	22	4144
1.00 - 1.49	.	.	65	698	687	338	207	87	207	44	196	.	2529
1.50 - 1.99	.	.	.	11	11	22	11	22	98	11	33	.	219
2.00 - 2.49	.	.	.	.	.	.	.	.	.	11	.	.	11
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	120	283	709	2116	1680	753	764	752	1482	436	818	87	

February 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	89	100	244	377	89	144	221	144	676	166	277	11	2538
0.50 - 0.99	55	188	365	1030	631	233	244	377	808	177	332	.	4440
1.00 - 1.49	.	.	55	631	609	210	122	122	332	233	199	.	2513
1.50 - 1.99	.	.	.	.	66	78	33	44	33	66	177	.	497
2.00 - 2.49	.	.	.	.	.	.	.	.	.	11	.	.	11
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	144	288	664	2038	1395	665	620	687	1849	653	985	11	

March 1980-1988, Gage 645													
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	160	120	230	320	180	100	250	360	450	150	310	.	2630
0.50 - 0.99	60	250	420	1080	630	340	290	380	680	210	420	10	4770
1.00 - 1.49	.	10	120	390	390	180	120	110	240	160	280	.	2000
1.50 - 1.99	.	.	.	10	.	20	30	90	170	120	120	.	560
2.00 - 2.49	.	.	.	.	.	.	.	.	.	20	20	.	40
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	220	380	770	1800	1200	640	690	940	1540	660	1150	10	

(Continued)

(Sheet 1 of 4)

Table E4 (Continued)
Monthly Joint Distribution of H_m versus T_p (All Years)

April 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	77	154	209	297	275	330	484	495	582	495	462	33	3893	
0.50 - 0.99	22	253	440	769	505	286	385	330	813	99	385	11	4298	
1.00 - 1.49	.	.	33	242	264	88	132	132	253	88	198	.	1430	
1.50 - 1.99	.	.	.	.	22	33	66	44	110	33	33	.	341
2.00 - 2.49	.	.	.	.	.	.	.	22	22	.	.	.	44
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	99	407	682	1308	1066	737	1067	1023	1780	715	1078	44		

May 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	72	165	196	455	331	362	714	620	755	207	393	52	4322	
0.50 - 0.99	10	186	558	1024	869	414	424	310	496	93	176	21	4581	
1.00 - 1.49	.	.	31	176	145	62	103	103	134	62	134	.	950	
1.50 - 1.99	.	.	.	21	41	.	.	10	21	21	21	.	135	
2.00 - 2.49	.	.	.	.	.	.	10	.	.	.	.	.	10
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	82	351	785	1676	1386	838	1251	1043	1406	383	724	73		

June 1980-1988, Gage 645													
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	117	265	371	764	488	509	997	880	615	424	212	170	5812
0.50 - 0.99	32	201	467	901	498	308	414	318	350	42	32	32	3595
1.00 - 1.49	.	.	32	159	159	32	53	11	117	.	21	.	584
1.50 - 1.99	.	.	.	.	11	.	.	.	.	.	.	.	11
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	149	466	670	1824	1156	849	1464	1209	1082	466	265	202	

(Continued)

(Sheet 2 of 4)

Table E4 (Continued)

Monthly Joint Distribution of H_m versus T_p (All Years)

July 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	73	198	405	634	530	582	1424	1164	936	405	468	135	6954
0.50 - 0.99	.	146	426	613	489	260	322	208	125	104	31	62	2786
1.00 - 1.49	.	.	10	135	42	21	31	.	21	.	.	.	260
1.50 - 1.99	0
2.00 - 2.49	0
2.50 - 2.99	0
3.00 - 3.49	0
3.50 - 3.99	0
4.00 - 4.49	0
4.50 - 4.99	0
5.00 - Greater	0
Total	73	344	841	1382	1061	863	1777	1372	1082	509	499	197	

August 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	40	182	243	677	617	445	890	849	768	404	384	20	5519	
0.50 - 0.99	10	222	576	981	586	384	354	212	273	30	101	.	3729	
1.00 - 1.49	.	.	30	182	152	81	20	20	51	40	71	.	647	
1.50 - 1.99	.	.	.	.	20	30	10	.	30	10	.	.	100
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	50	404	849	1840	1375	940	1274	1081	1122	484	556	20		

September 1980-1988, Gage 645													
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	53	32	118	299	150	224	385	524	705	406	481	75	3452
0.50 - 0.99	53	118	470	833	652	491	385	449	545	267	449	21	4733
1.00 - 1.49	.	.	53	438	406	203	139	107	160	43	118	21	1688
1.50 - 1.99	.	.	.	11	32	11	.	11	.	.	32	.	97
2.00 - 2.49	.	.	.	.	.	.	.	.	.	11	21	.	32
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	106	150	641	1581	1240	929	909	1091	1410	727	1101	117	

(Continued)

(Sheet 3 of 4)

Table E4 (Concluded)
Monthly Joint Distribution of H_m versus T_p (All Years)

October 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	40	40	69	188	188	149	317	347	615	258	407	79	2697	
0.50 - 0.99	10	79	427	883	635	248	337	317	813	188	298	50	4285	
1.00 - 1.49	.	.	40	446	446	308	149	179	357	198	218	30	2371	
1.50 - 1.99	.	.	.	10	89	69	30	69	159	60	60	50	596	
2.00 - 2.49	.	.	.	.	.	10	.	.	.	20	20	.	50
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	50	119	536	1527	1358	784	833	912	1944	724	1003	209		

November 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	30	51	223	304	172	172	274	274	426	396	385	41	2748	
0.50 - 0.99	20	142	548	1085	933	507	284	264	426	264	254	61	4788	
1.00 - 1.49	.	.	61	294	588	274	132	61	132	193	183	41	1959	
1.50 - 1.99	.	.	.	20	81	51	10	101	101	41	91	.	496	
2.00 - 2.49	.	.	.	.	.	.	.	.	10	.	.	.	10
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	50	193	832	1703	1774	1004	700	700	1095	894	913	143		

December 1980-1988, Gage 645 Percent Occurrence(X100) of Height and Period														Total
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	71	122	182	314	132	142	203	476	790	517	476	162	3587	
0.50 - 0.99	10	203	517	1398	1023	243	193	213	334	91	344	71	4640	
1.00 - 1.49	.	.	91	324	466	152	51	122	132	30	162	.	1530	
1.50 - 1.99	.	.	.	10	30	.	30	20	41	10	91	.	232	
2.00 - 2.49	.	.	.	.	.	10	.	.	.	.	.	.	10
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	81	325	790	2046	1651	547	477	831	1297	648	1073	233		

(Sheet 4 of 4)

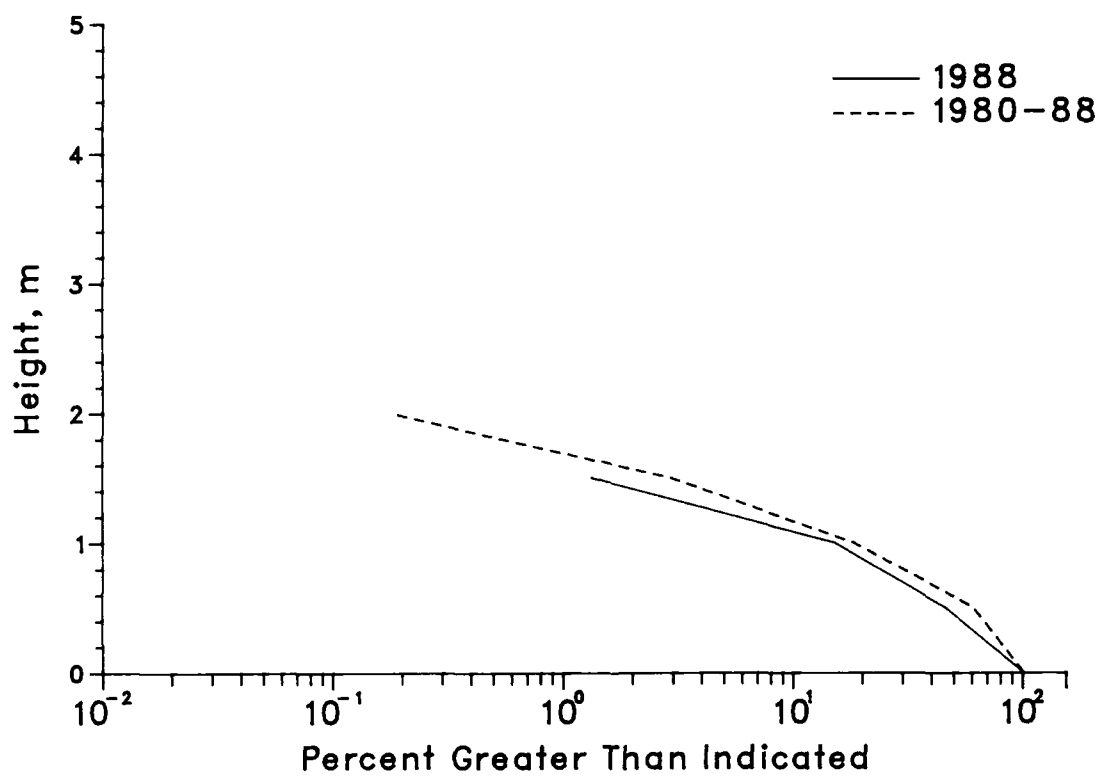


Figure E2. Annual cumulative wave height distributions
for Gage 645

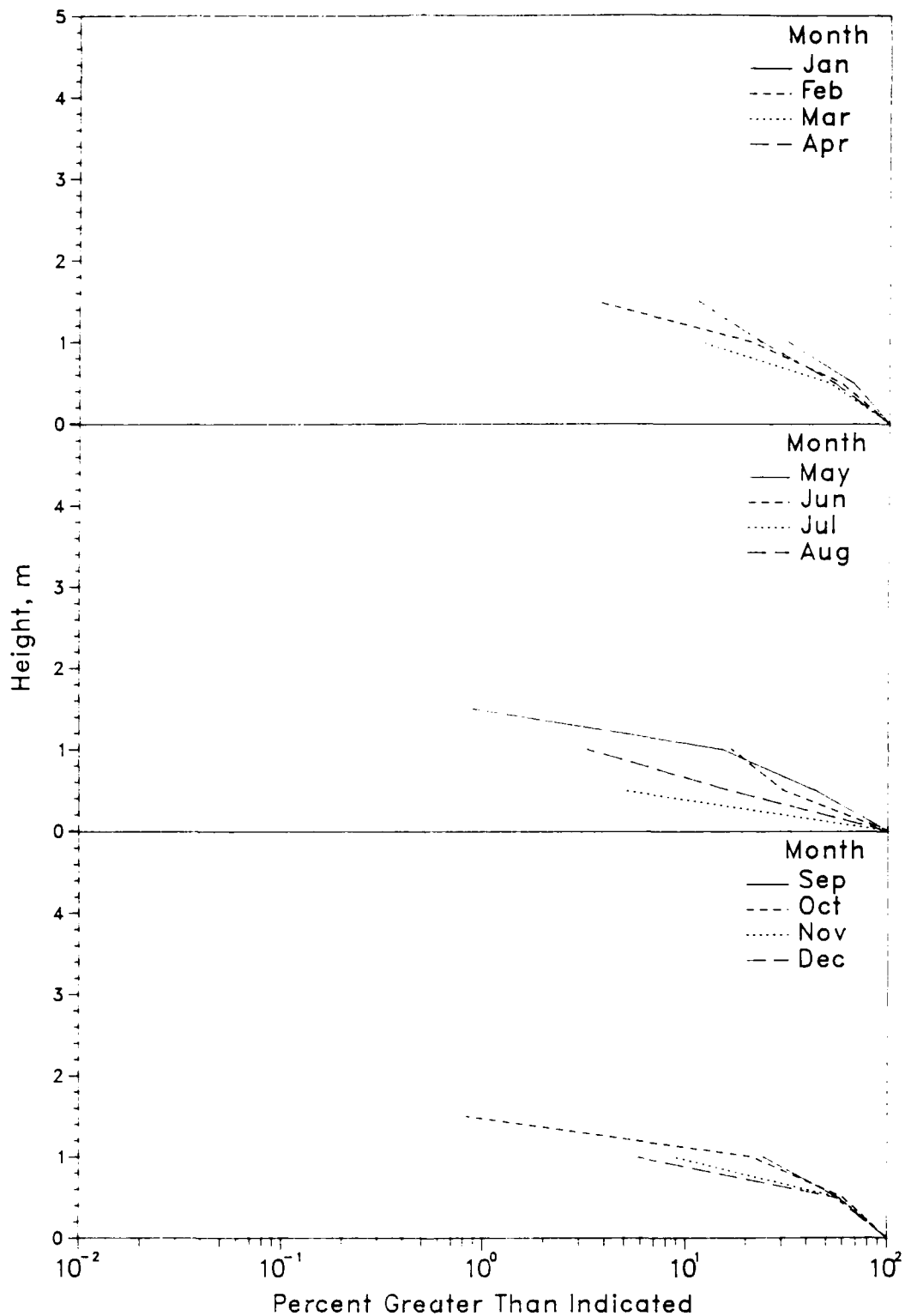


Figure E3. 1988 monthly wave height distributions
for Gage 645

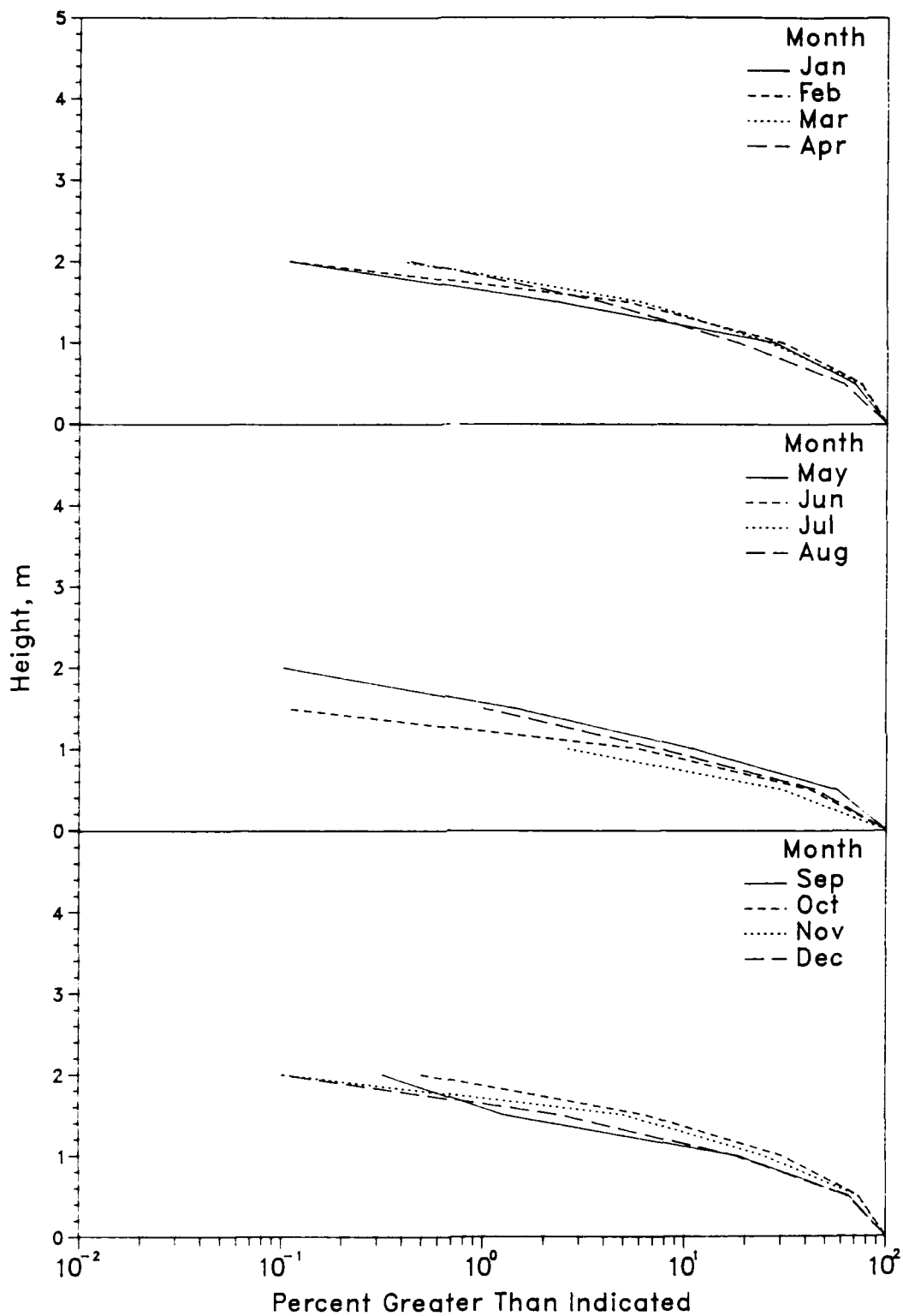


Figure E4. 1980-1988 monthly wave height distributions
for Gage 645

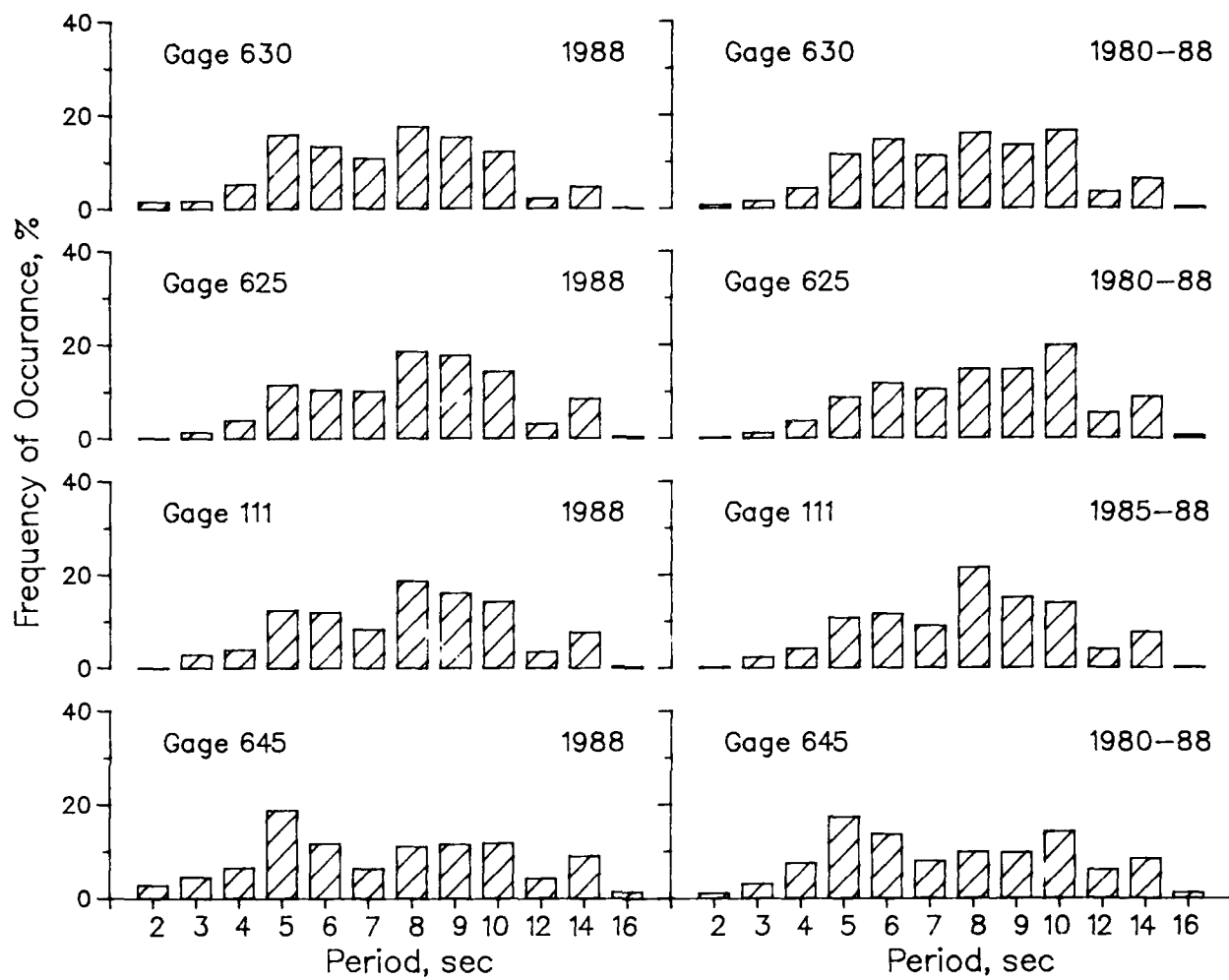


Figure E5. Annual wave period distributions for all gages

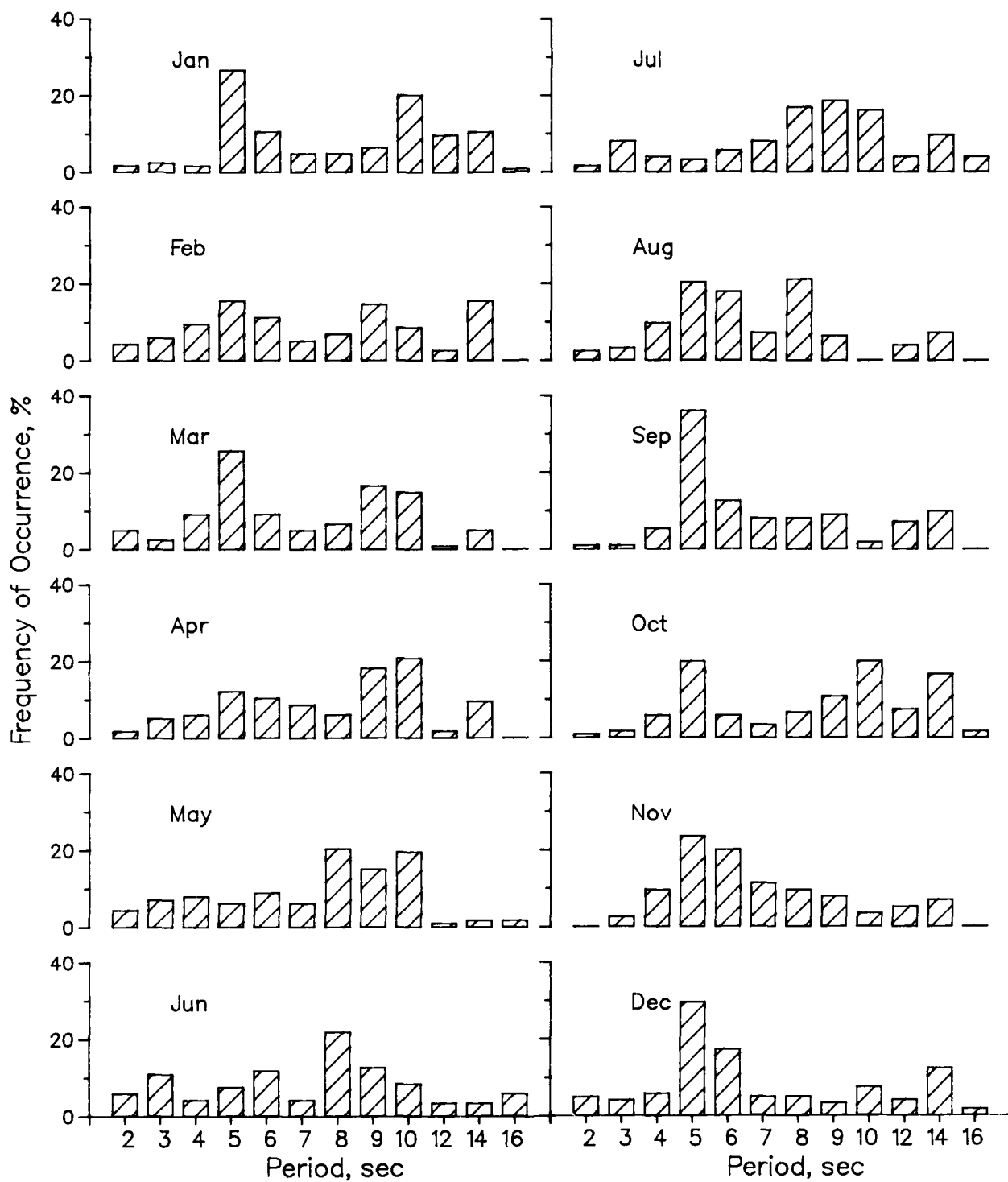


Figure E6. 1988 monthly wave period distributions for Gage 645

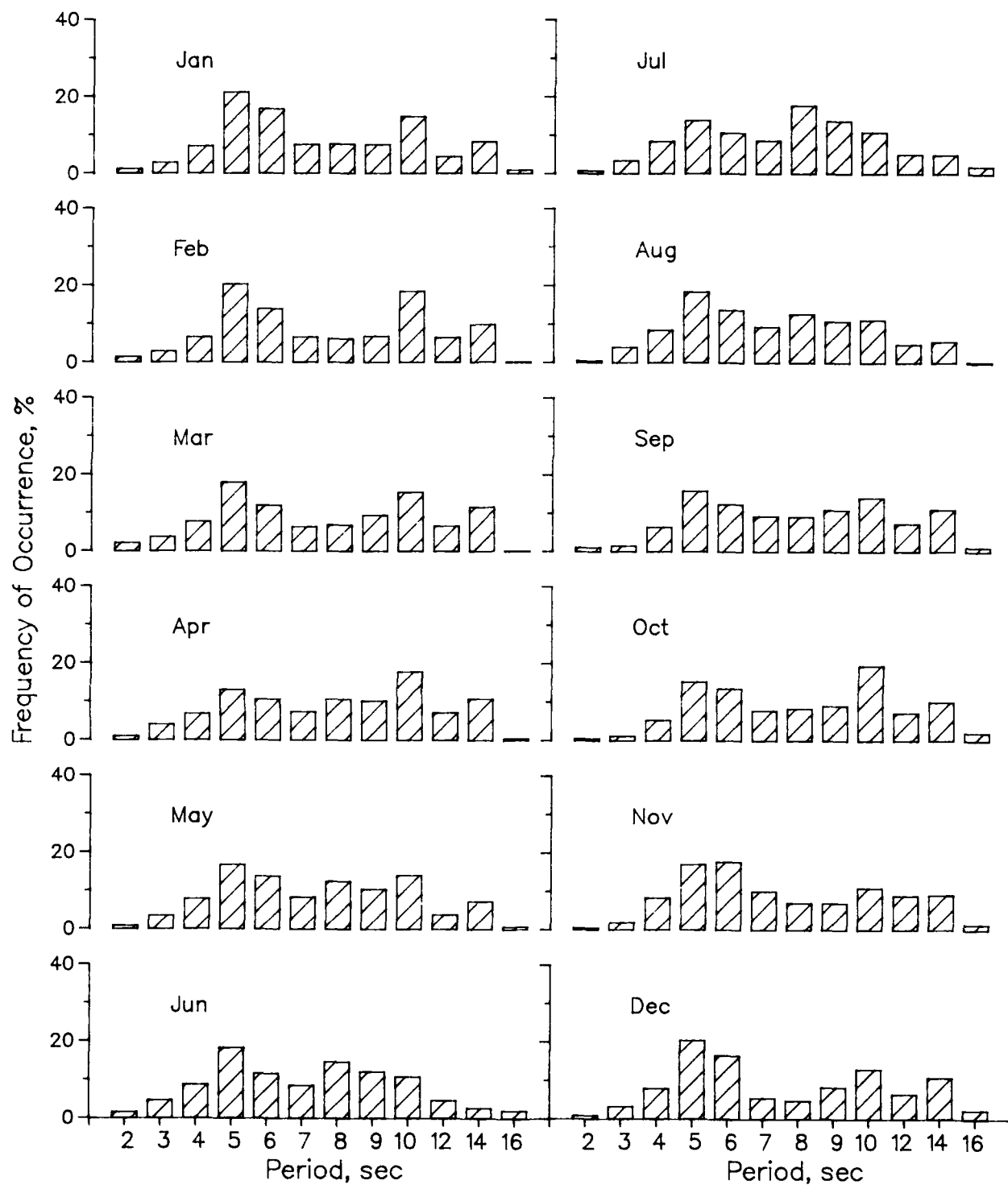


Figure E7. 1980-1988 monthly wave period distributions for Gage 645

Table E5
1988 Persistence of H_{mo} for Gage 645

Height (m)	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	52	39	32	23	18	11	10	9	7	5	4	2							1
1.0	41	24	14	6	4		2												
1.5	7	3	1																
2.0																			

Table E6
1980 through 1988 Persistence of H_{mo} for Gage 645

Height (m)	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	42	36	29	24	19	15	12	11	9	8	7	6		5			4		3
1.0	43	25	15	9	5	3	2												
1.5	12	5	2		1														
2.0	1																		
2.5																			
3.0																			
3.5																			
4.0																			

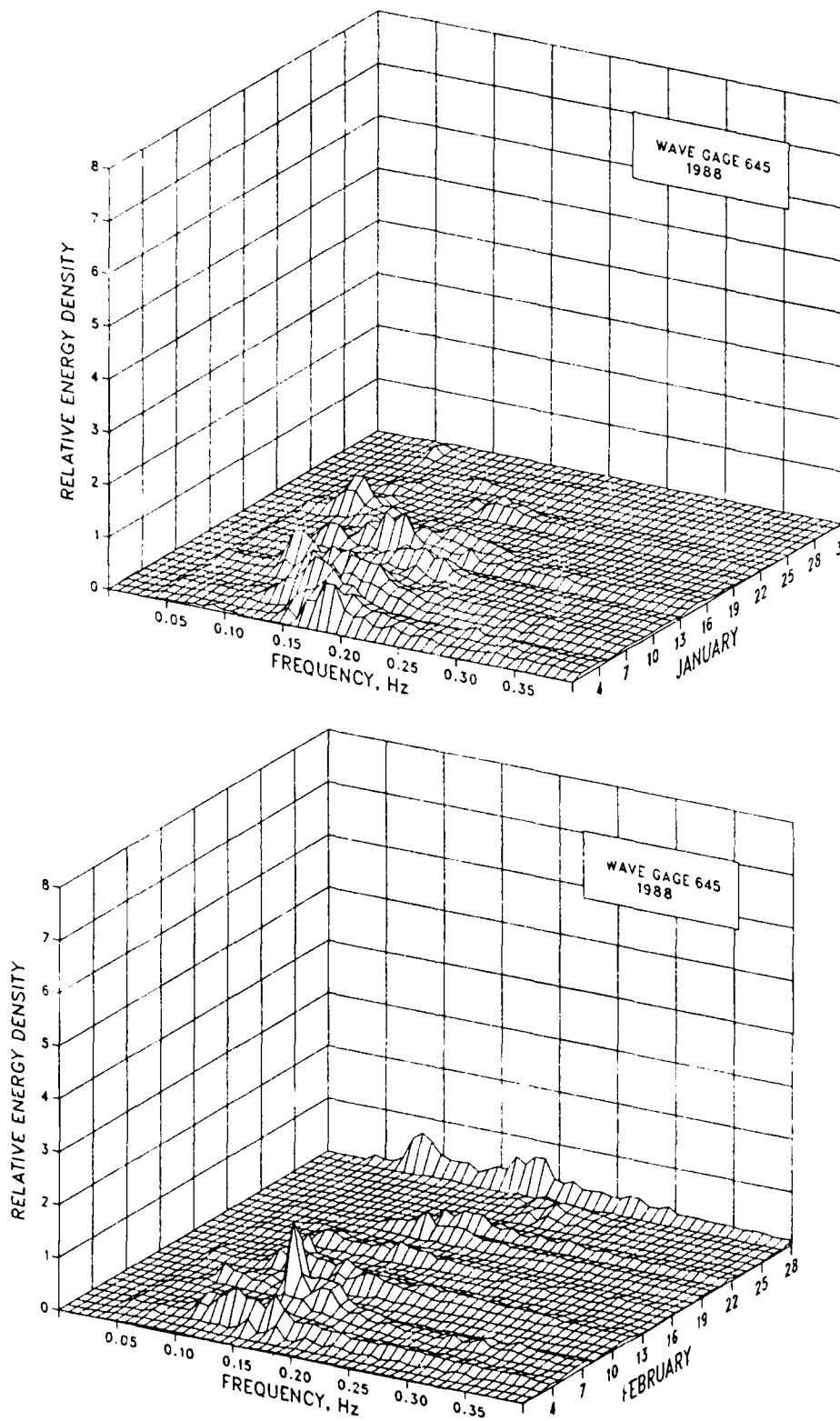


Figure E8. 1988 monthly spectra for Gage 645
(Sheet 1 of 6)

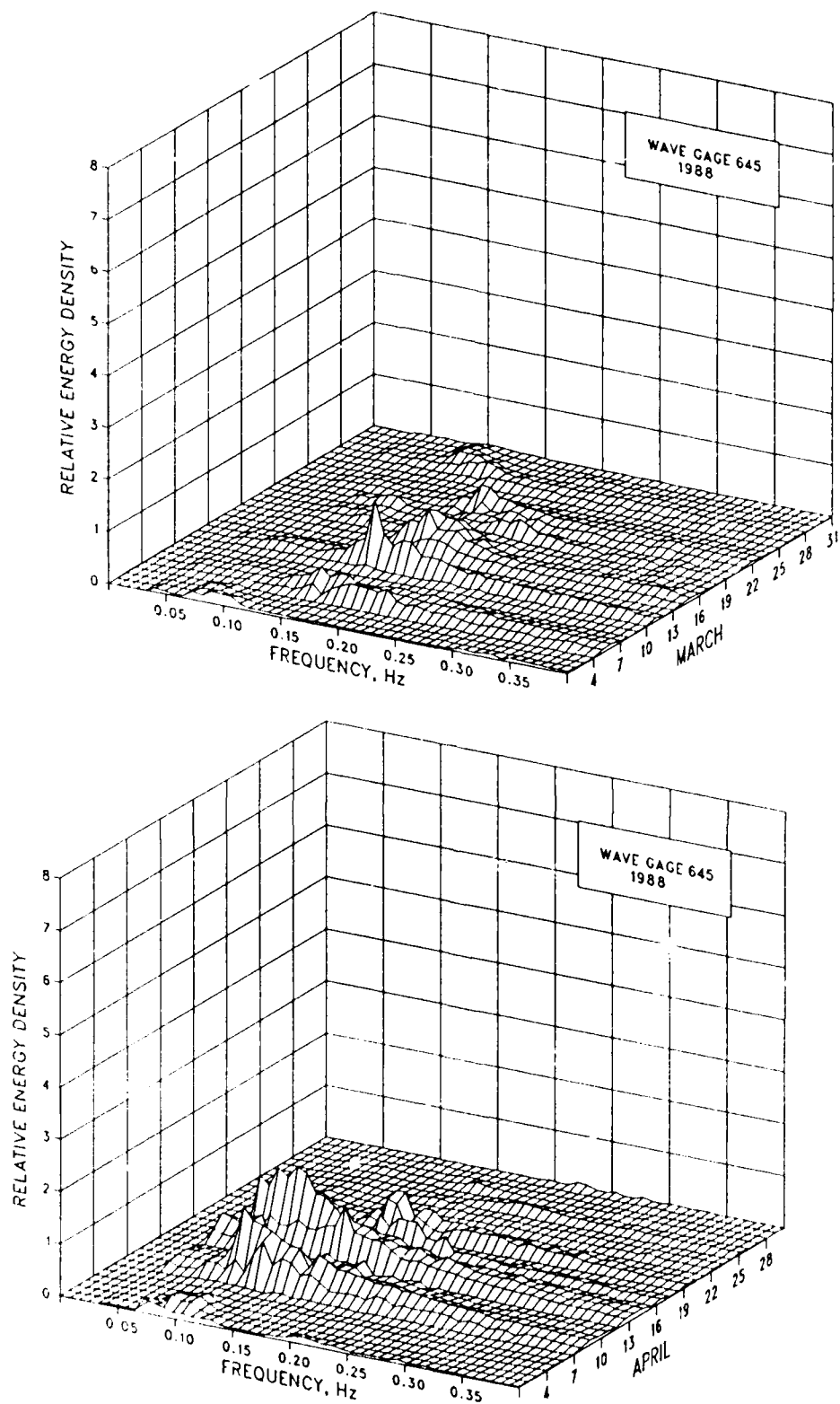


Figure E8. (Sheet 2 of 6)

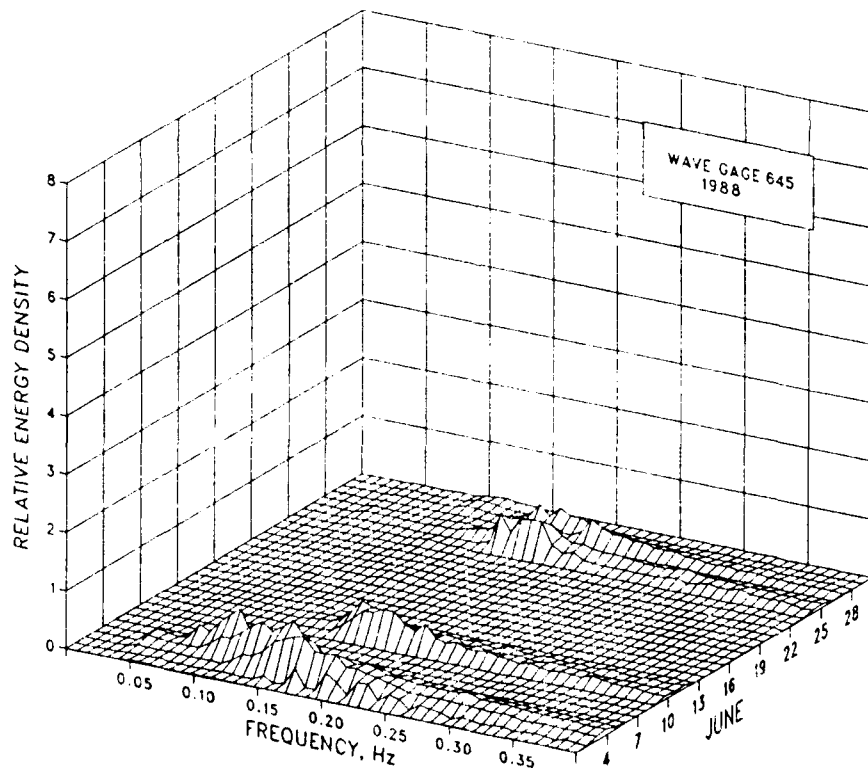
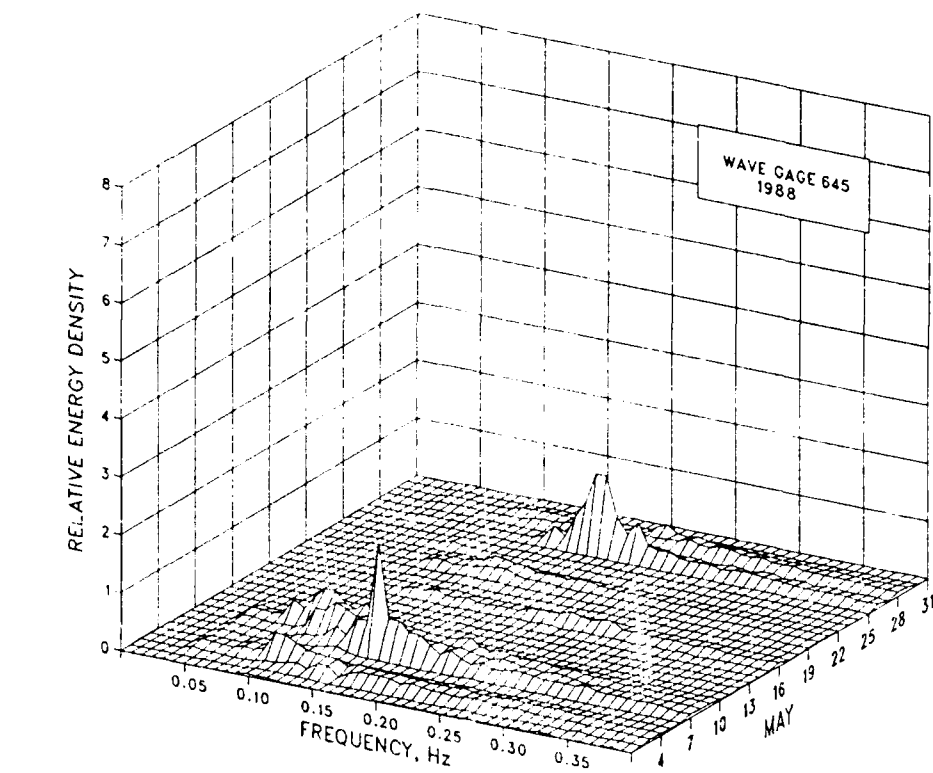


Figure E8. (Sheet 3 of 6)

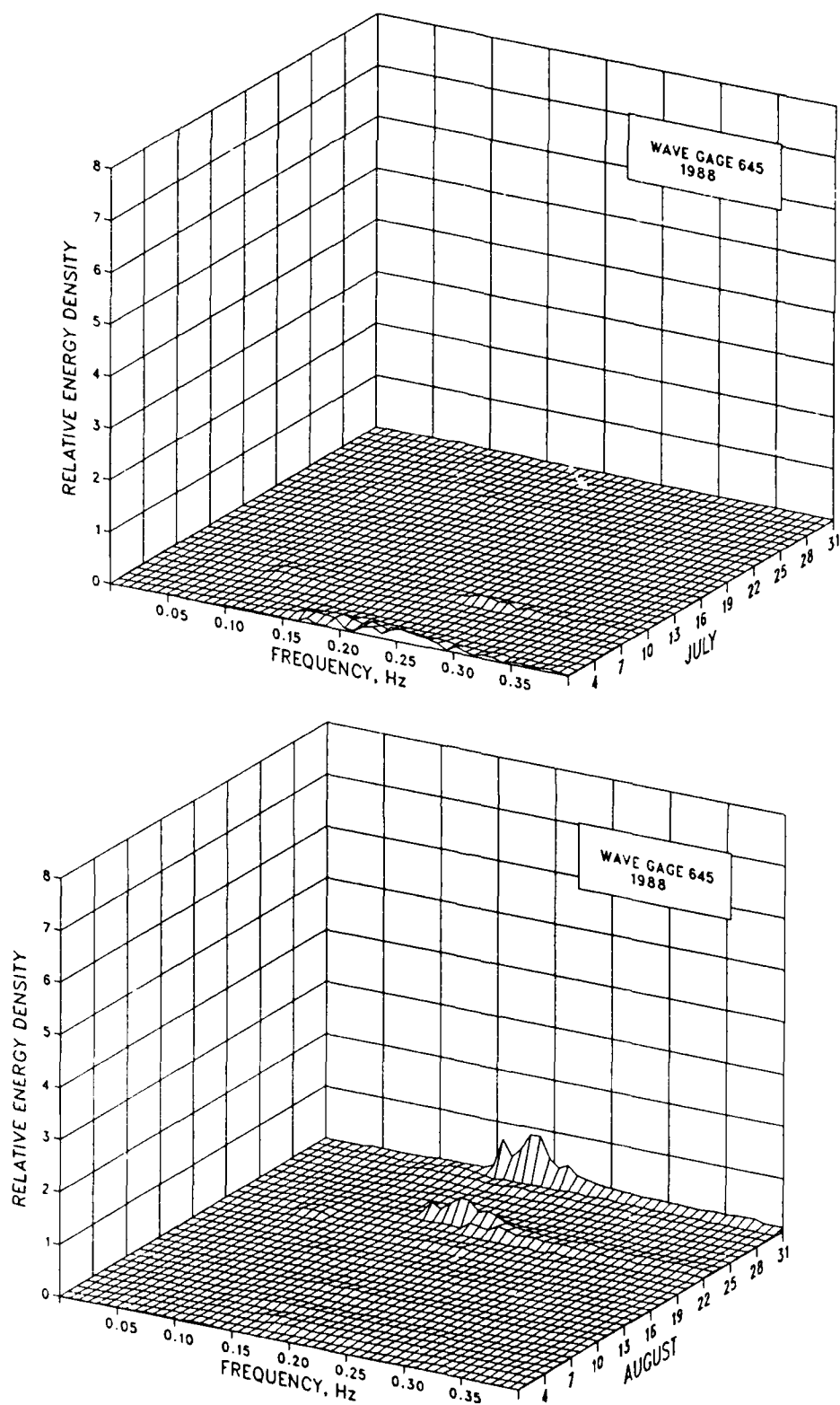


Figure E8. (Sheet 4 of 6)

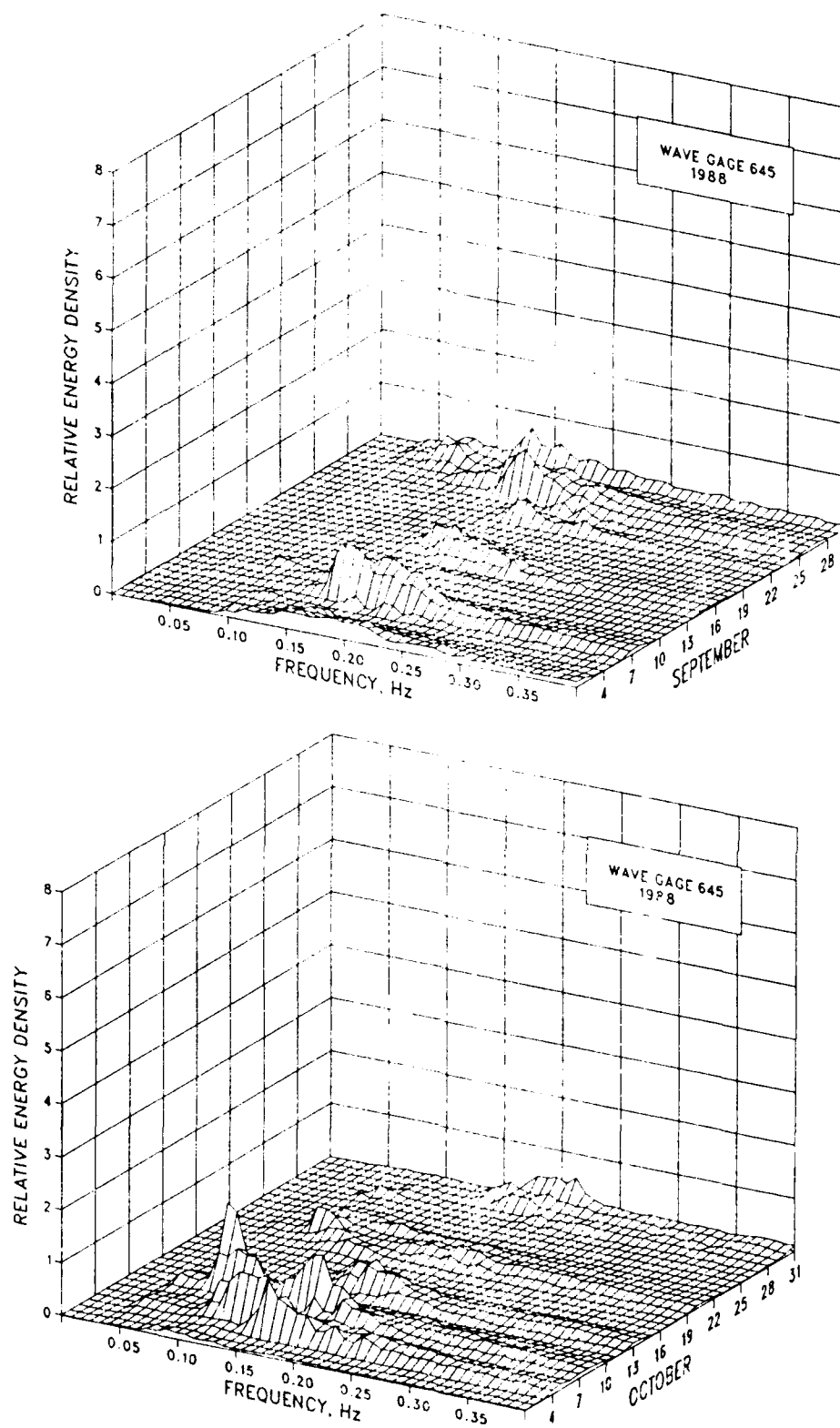


Figure E8. (Sheet 5 of 6)

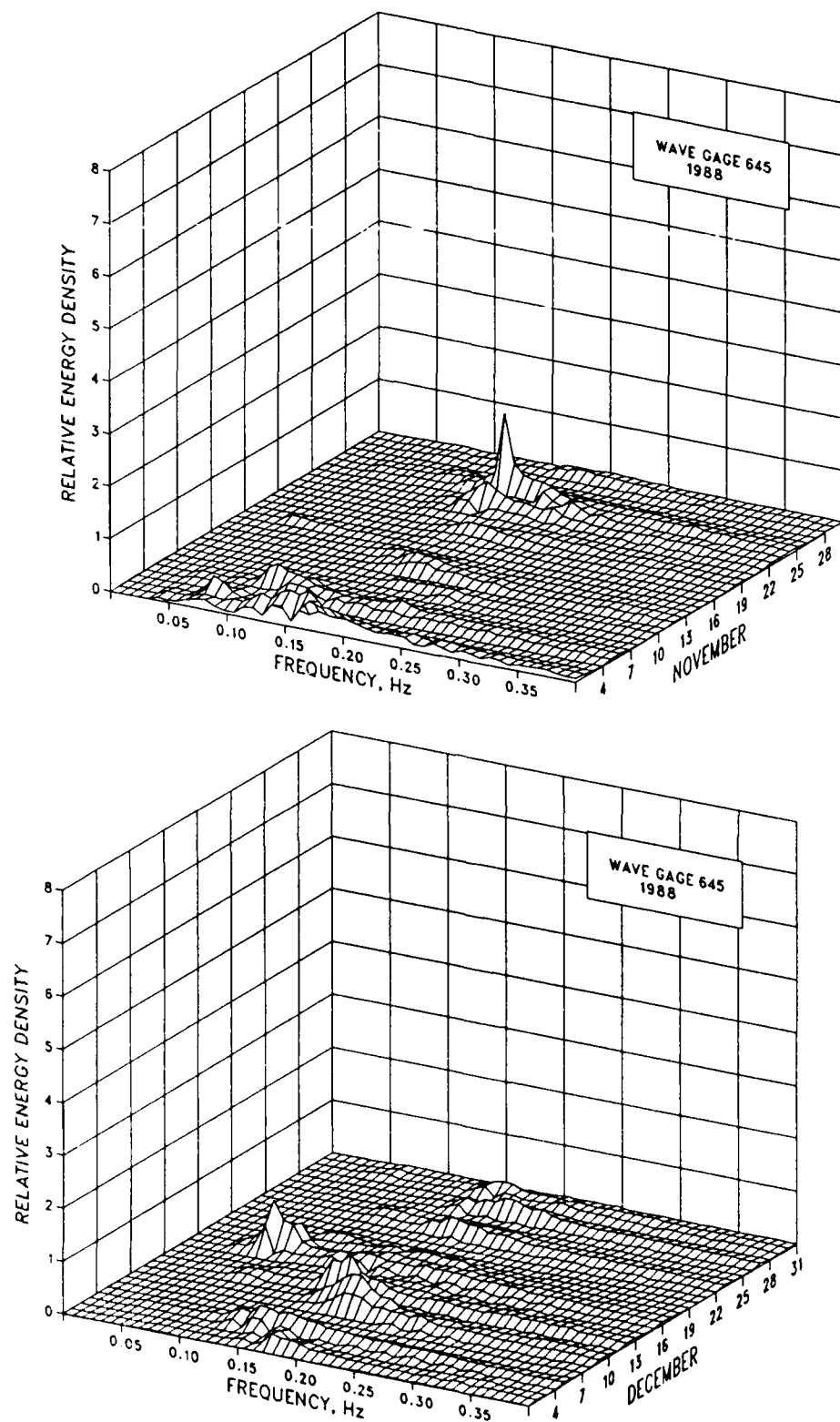


Figure E8. (Sheet 6 of 6)

Table E7
Wave Statistics for Gage 645

Month	1988							1980-88						
	Height			Date	Period			Height			Date	Period		
	Std.				Std.			Std.				Std.		
	Mean	Dev.	Extreme		Mean	Dev.	Number	Mean	Dev.	Extreme		Mean	Dev.	Number
	m	m	m		sec	sec	Obs.	m	m	m		sec	sec	Obs.
Jan	0.8	0.4	1.5	3	8.8	3.5	124	0.8	0.4	2.0	1980	7.9	3.2	917
Feb	0.7	0.4	1.7	25	8.0	3.3	116	0.8	0.4	2.0	1983	8.2	3.2	903
Mar	0.6	0.3	1.5	11	7.5	2.8	121	0.8	0.4	2.3	1980	8.2	3.4	1000
Apr	0.8	0.5	1.9	13	8.6	3.2	116	0.7	0.4	2.3	1987	8.6	3.3	910
May	0.6	0.4	1.5	7	8.1	3.0	113	0.6	0.4	2.0	1987	7.9	3.1	967
Jun	0.5	0.4	1.4	3	8.2	3.7	119	0.5	0.3	1.6	1987	7.7	3.1	943
Jul	0.3	0.2	0.9	1	9.3	3.6	124	0.5	0.2	1.3	1985	8.1	3.1	962
Aug	0.4	0.2	1.1	31	7.5	2.9	123	0.6	0.3	1.7	1982	7.7	2.9	989
Sep	0.7	0.4	1.4	6	7.8	3.2	111	0.7	0.4	2.1	1985	8.5	3.3	936
Oct	0.7	0.4	1.5	8	9.2	3.3	121	0.8	0.5	2.2	1982	8.8	3.3	1008
Nov	0.6	0.3	1.5	1	7.5	2.9	115	0.8	0.4	2.0	1981	8.3	3.5	986
Dec	0.6	0.4	1.2	16	7.9	3.9	122	0.7	0.4	2.1	1985	8.3	3.6	987
Annual	0.6	0.4	1.9	Apr	8.2	3.4	1425	0.7	0.4	2.3	Apr	8.2	3.3	11508

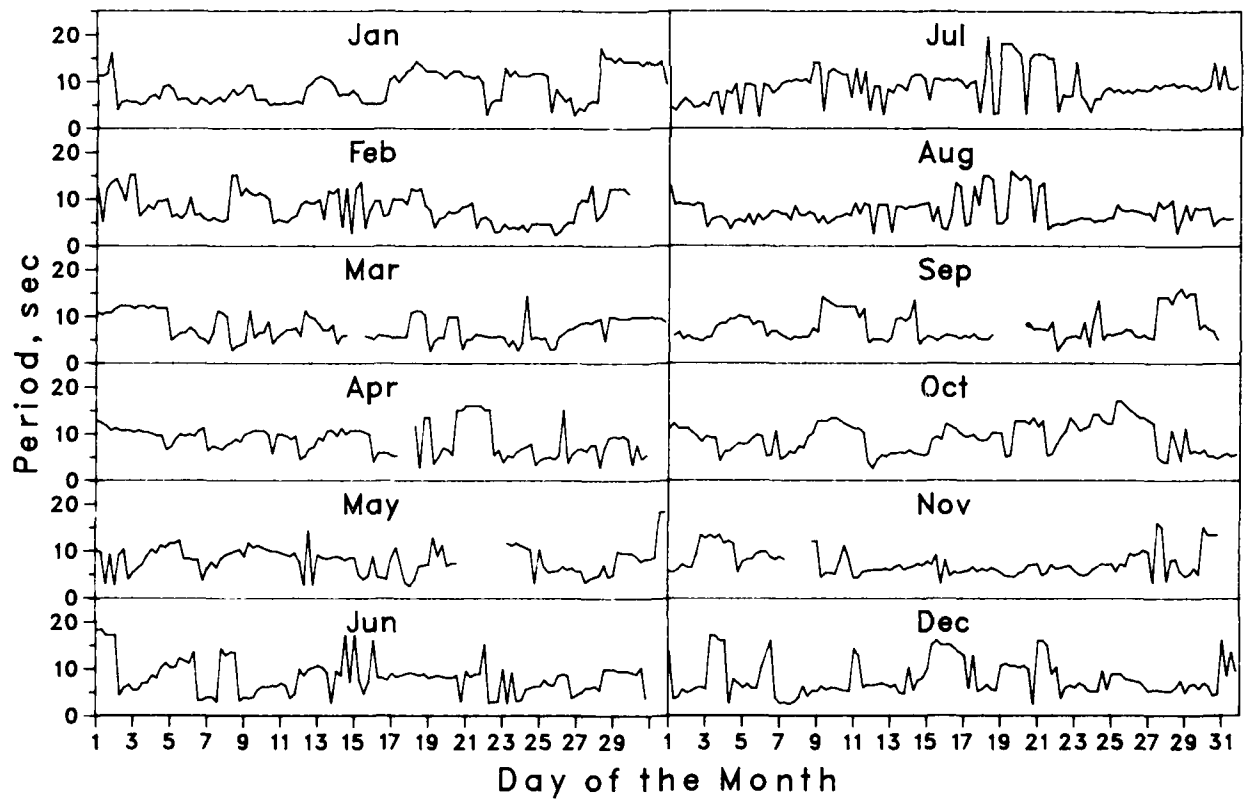
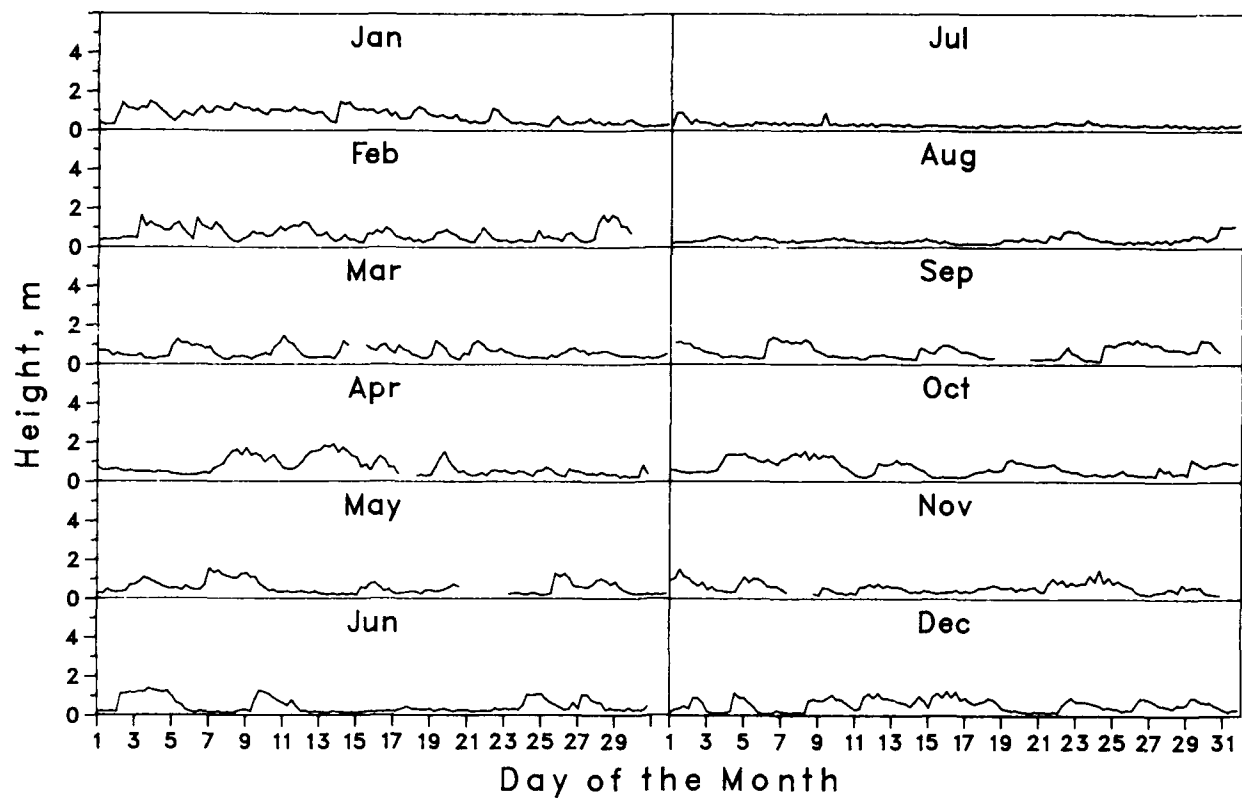


Figure E9. Time-histories of wave height and period for Gage 645